INTERNATIONAL MARINE ENGINEERING

Main Office: NEW YORK, 17 Battery Place SUBSCRIPTION PRICE: Domestic, $2.00; Foreign, $2.50 LONDON OFFICE: 31 Christopher St., E. C.

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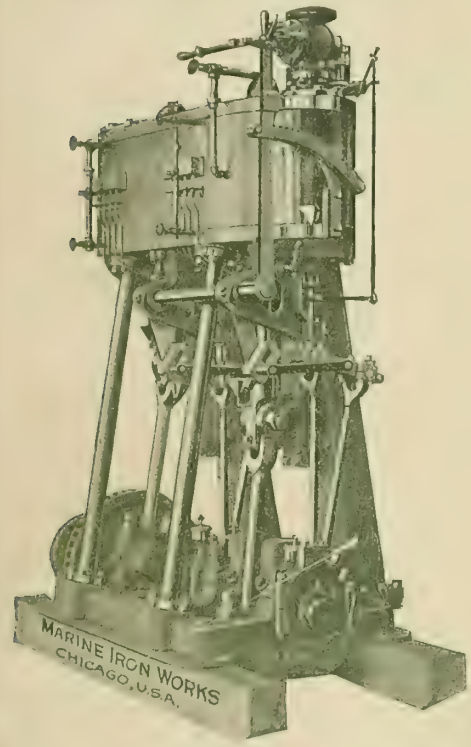
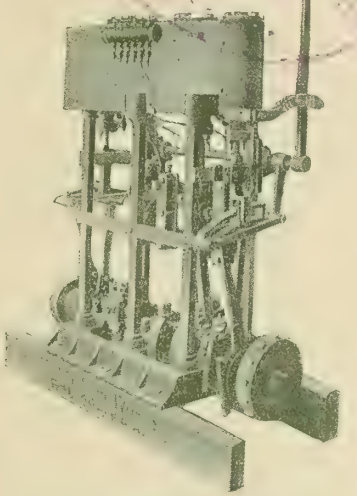
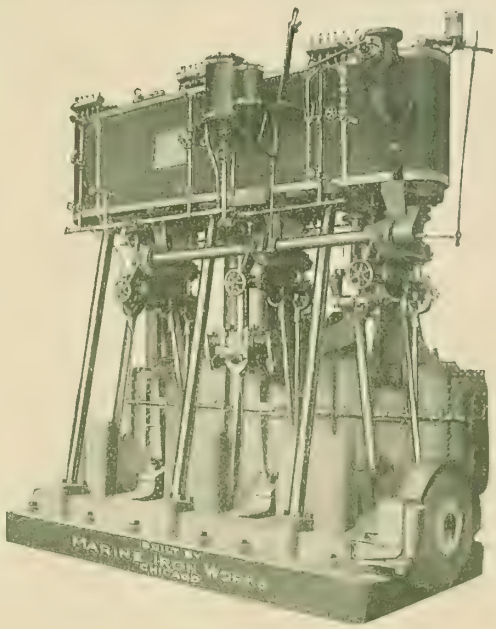


Heavy Service Fore and Aft Compound

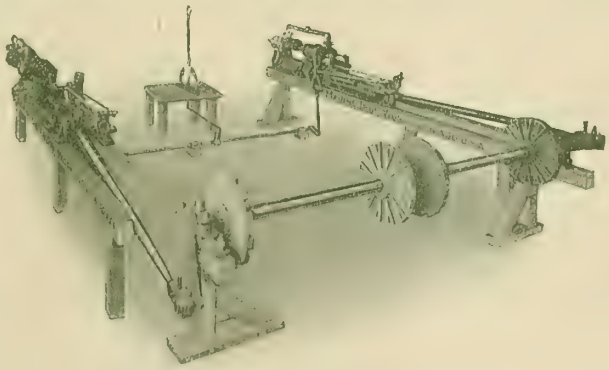


Open Column Frame
Fore and Aft Compound



Triple Expansion

MARINE ENGINES



M. I. W. Centralized Valve Gear
Stern Paddle-Wheel Engines

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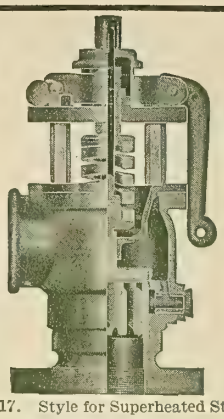

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The ACCURACY STANDARD

THE ASHTON VALVE CO., Boston, U. S. A.
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The Battleship "TEXAS," now under construction for the United States Navy, will be equipped with

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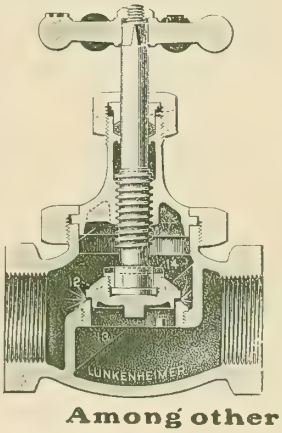
This Company is also furnishing Windlasses, Steering Gears and other Auxiliaries for the Battleships "MORENO" and "RIVADAVIA," now under construction in this country for the Argentine Republic.



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can justly be called "VALVES OF PERFECTION," as they have sufficient strength, are made of materials best suited for steam use, faultless workmanship, large areas, insuring the free and unobstructed passage of steam, and the seating faces can be reground quite a number of times.

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"MOST supply houses sell them—yours CAN—if they DONT or WONT,—tell US."

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International Marine Engineering

JANUARY, 1913

CONTENTS

		PAGE
LIGHTHOUSES AND BUOYS OF NEW YORK HARBOR. Illustrated	JAMES PATTISON	1
ANNUAL REPORT OF THE SECRETARY OF THE NAVY		4
AN OIL ENGINED COASTER	GEORGE THOW	6
EXPERIMENTS ON THE FULTON AND FROUDE. Illustrated	PROF. C. H. PEABODY	7
RECENT DEVELOPMENTS IN OIL FUEL BURNING. Illustrated	E. H. PEABODY	14
McANDREW'S FLOATING SCHOOL	CAPTAIN C. A. McALLISTER	18
WHAT CONSTITUTES A STEAMSHIP TERMINAL	H. McL. HARDING	21
A MIETZ & WEISS MOTOR TUG BOAT. Illustrated		23
STABILITY OF SHIPS—NOTES FOR COMMANDERS. Illustrated	GEORGE NICOL	24
THE HANDICAP OF THE TECHNICAL GRADUATE. Illustrated	PROF. H. A. EVERETT	27
ANNUAL REPORT OF THE CHIEF OF THE BUREAU OF CONSTRUCTION AND REPAIR		28
WESTINGHOUSE TELPHERAGE SYSTEM FOR HANDLING FREIGHT AT STEAMSHIP TERMINALS. Illustrated		29
AN UNUSUAL MOTOR TUG BUILT TO DO THE WORK OF TWO STEEL STEAM TUGS. Illustrated		30
TOWBOAT NARRAGANSETT, A GENERAL UTILITY BOAT. Illustrated		31
TRIPLE-SCREW MOTOR SHIP ALKMAAR. Illustrated	J. RENDELL WILSON	32
LETTERS FROM PRACTICAL MARINE ENGINEERS:		
A BROKEN CONDENSER BAFFLE		33
PATCHING A BOILER		33
A GOOD WAY TO BLOCK THE PORTS IN A STEAM CHEST		34
FITTING A NEW CYLINDER LINER		34
DESIGN OF A CRANK SHAFT		35
DISASTROUS ACCIDENT TO A BEAM ENGINE		36
MARINE ARTICLES IN THE ENGINEERING PRESS		37
EDITORIAL COMMENT		40
IMPROVED MARINE ENGINEERING SPECIALTIES. Illustrated		42
TECHNICAL PUBLICATIONS		45
SELECTED MARINE PATENTS. Illustrated		46

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CHRISTOPHER STREET
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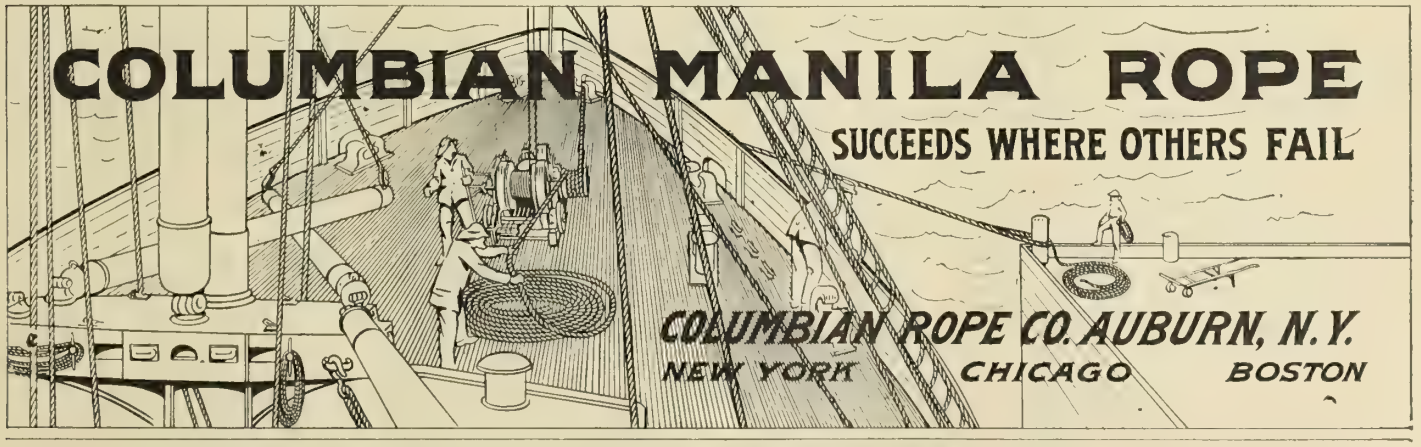
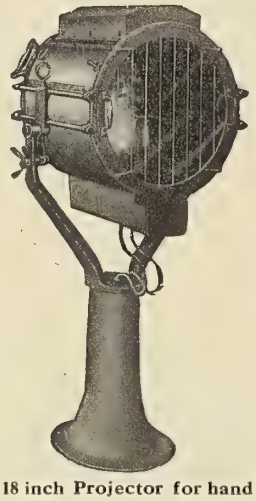


G-E PROJECTOR ON STEAMER "C. W. MORSE" ILLUMINATING CAPITOL AT ALBANY, N.Y.



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Safety and Greater Reliability

in the navigation of sea-going vessels which travel or dock at night is obtained by the use of

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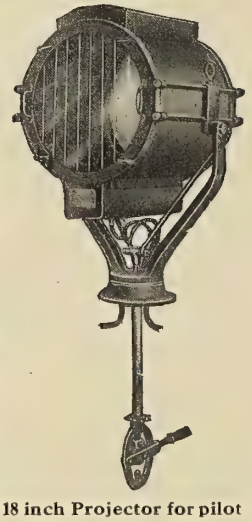

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Large sizes up to 80 inch diameter and projectors suitable for special requirements of control are furnished to meet every condition of Marine Work.

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Messrs. W. R. Grace & Co., Lima, Peru and Valparaiso, Chile

General Electric Co. of New York, 83 Cannon St., London, E. C., England 3596

TRADE PUBLICATIONS.

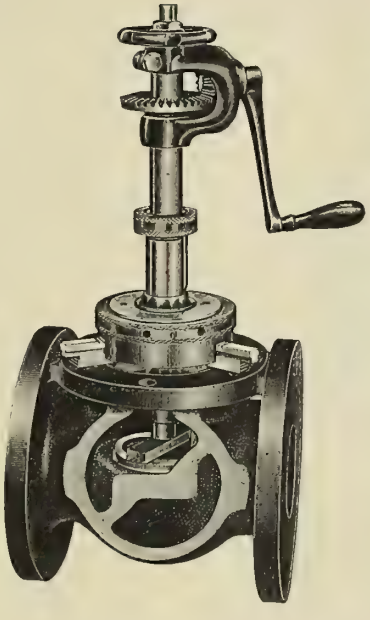
AMERICA

Eckliff automatic circulators for marine boilers are described in a circular published by the Eckliff Automatic Boiler Circulator Company, Detroit, Mich. "The Eckliff automatic boiler circulator for Scotch boilers is a thermo-syphon, being governed entirely by the law of gravitation, and not depending on valves, injectors, pumps, hydrokineter attachments, or any other mechanical movement that is liable to disorder. It is made of special steel tubing, placed and shackled within the boiler on the furnaces, as shown by subsequent illustrations. The Eckliff circulator can be installed in any boiler, old or new, same having ordinary manholes, and complete installation can be made without cutting, mutilating or disturbing the boiler within two to three hours after boiler is cold. Our circulator once installed requires no further attention, because it is automatic, with no intricate mechanism to become abortive. It does not interfere in any way with entering and cleaning the boiler, and is not dependent upon the human element. The Eckliff circulator causes rapid and constant circulation of water in the boiler, thereby eliminating pitting, furrowing or cracking of furnaces and other destructive elements in the lower half of the shell. Hence vanish extensive repairs, expense and delay. Our circulator will not wear out, therefore no replacement or renewal expense has to be considered. The Eckliff circulator increases the life of the boiler fully 50 percent to 100 percent. By removing dead water in the lower half of the shell of the Scotch boiler, the unequal expansion, contraction and terrific strains under which a boiler is constantly laboring are eliminated, and leaky boilers at the bottom become ancient history. In other words, all disadvantages peculiar to the Scotch type of boiler are overcome. After installing an Eckliff circulator the temperature at the bottom of the boiler will be within a few degrees of the temperature of the steam chamber, according to pressure carried, causing the following benefits: Factor of safety; equality of heat top and bottom; perfect circulation; steaming capacity increased; clean, healthy boiler; scale formation minimized."

Thermometers for every purpose, and especially for use on board ship, are described in a catalogue issued by the H. & M. Division of the Taylor Instrument Companies, Rochester, N. Y.

"Dont's for Buyers of Lubricants" is the title of a folder issued by the Albany Lubricating Company, 708 Washington street, New York. Here are two of the "Dont's": "Don't purchase a lubricant because someone tells you a wonderful tale as to what it did for Tom, Dick or Harry. Find out exactly what it will do for you by testing it. You will be absolutely sure then. Order by test and you will order Albany Grease. Don't purchase ordinary greases that contain acids, resin, resinous oils, lime soaps, talc, etc., and which do not remain permanently neutral, free from acidity. Such greases contain the acids and foreign substances that eat the bearings, gum up, clog and create friction instead of reducing it. Have you ever wondered what the ill-smelling, discolored, hardened mass was that is left in the grease cup after using some ordinary grease? That residue composes the biggest part of ordinary greases."

"Plymouth Products" is the title of a monthly pamphlet published by the Plymouth Cordage Company, North Plymouth, Mass., and all interested in the subject of manufacture and use of rope should ask to be put on the free mailing list of this publication. "Those who have read the preceding numbers of this publication will recall that we narrated, briefly, the story of rope-making from earliest times down to the period when modern machine methods of manufacture were introduced. We also described the various fibers from which rope is made, and pointed out the importance of expert knowledge and foresight in the buying of these raw materials. Purchasing power and the resources for grading and using each bale of fiber, with strict regard to its particular fitness for his products, are also of special value to the rope manufacturer. Some account of the Plymouth Cordage Company's position in these matters should, therefore, be of interest to our readers prior to our description of modern rope-making processes. Rope is made for a great variety of uses and different fibers are employed, but Manilla fiber or hemp, as it is commonly called, is the principal, and for most purposes, the best material."



The United States Navy and the British Admiralty have used for twenty-two years the Morse Valve Reseating Machine designed and manufactured by us or the Improved Dexter Machine we now manufacture.

An Engineer of the British Admiralty makes the following statement:

Of all machines and equipment supplied for the Admiralty ships there is no machine more universally useful, practical or efficient than these machines."

The manager of one of the largest shipbuilding works in the world made this statement:

"Although there are many things useful on board ship, there is nothing more useful, more essential or better known by marine and naval engineers or better liked than the Dexter Machine for repairing valves."

The Pittsburg Steamship Co. is using fifty-nine Dexter Valve Reseating Machines. The Southern Pacific Co., The United Fruit Co., the Cleveland Cliffs Co., the Provident Steamship Co., in fact, nearly all of the transportation companies in the United States have adopted these machines.

***Send for Catalog* I-15**

LEAVITT MACHINE CO. Orange, Mass., U. S. A.

Agents for British Isles:

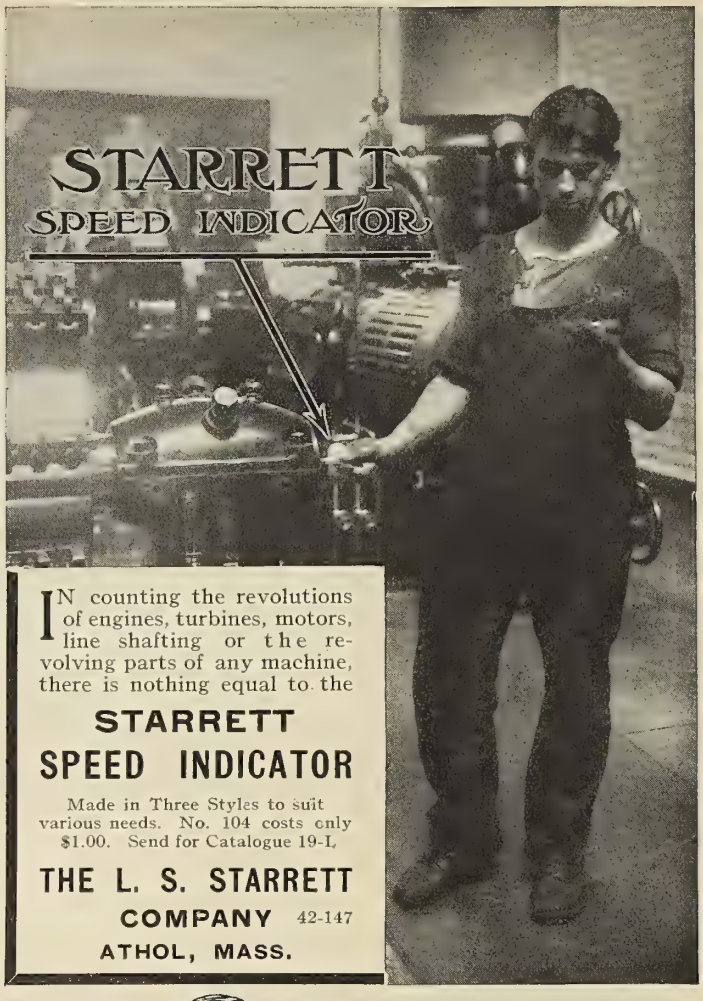
CROMIL ENGINEERING CO., Milburn House, Newcastle-on-Tyne, England

Terry turbines for marine work are described in Bulletin No. 16, published by the Terry Steam Turbine Company, 90 West street, New York. On the United States warships which were reviewed in New York harbor in October, and on the miscellaneous ships which stood near by, there were considerably over 100 Terry turbines. These are used for driving forced draft fans, for electric light generators, boiler feed pumps and ballast pumps. "The complete success of the Terry turbine on shipboard has been due to absolute reliability, because of simplicity of construction, unusually small space occupied, freedom from repairs, comparatively light weight and lack of vibration."

Cramp's gear bronzes are described in a booklet just issued by the William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa. "For many years we have been using bronze worm wheels and worms in the manufacture of hoisting engines, water turbines, turret-turning gear, steering gear and machinery of all kinds. We have also furnished these bronze wheels and worms for machinery constructed by our customers, such as elevators, lifting bridges, draw-bridges, locomotive drop tables, marine railways, automobiles, etc. Our experience has been so varied and has extended over such a length of time that we feel qualified to advise prospective customers in regard to the metals to be used for different purposes in gearing, and especially to advise engineers of the most suitable metals to use in new branches of machinery construction when it is desired to substitute gearing for some other means of power transmission. Our experience has led us to adopt for different purposes six different gear metals."

Marine refrigeration and ice making is the subject of a catalogue published by the Brunswick Refrigerating Company, 130 Jersey street, New Brunswick, N. J. A steamship, yacht, dredge or sea-going vessel of any type, unless equipped with a refrigerating plant, must either store a great quantity of ice or go into port at frequent intervals, both for ice and a fresh supply of meats and other perishable products. The installation of a special marine "Brunswick" makes a vessel independent of port so far as the commissary department is concerned. The steward may lay in his stores for weeks ahead and always serve fresh meats, dairy products and fruits. If ice is necessary in addition to the refrigeration provided, an ice-making set may be installed to manufacture any quantity required. Ice-making tanks are so constructed that the ship's motion cannot spill either the water in the ice cans or the brine in the tank. A small water cooler or shuttle-butt is a most convenient addition to the system. Among the many steamship companies whose ships are equipped with "Brunswick" refrigerating plants are the following: The American-Hawaiian Steamship Company, 22 vessels; A. H. Bull & Company, 5 vessels; Hamburg-American Steamship Company, 4 vessels; Coastwise Transportation Company, 5 vessels; W. R. Grace & Company, 2 vessels, and many others. Besides these, "Brunswick" refrigerating plants are installed on 40 vessels belonging to the United States Government.

"The Biddle Bulletin" is the title of a monthly publication issued by the Biddle Hardware Company, 514 Commerce street, Philadelphia, Pa. "This is the opening number of *The Biddle Bulletin*—a publication designed to keep our customers abreast of new developments in the monel metal market. Complete information about our stock list will be given in *The Biddle Bulletin*, which will be issued regularly and mailed gratis to those who desire it. Price changes and size changes of monel metal rods, sheets, etc., will be promptly announced, and interesting facts pertaining to new uses of this valuable material will be published from time to time. Monel metal has quickly risen to a position of extreme importance in many fields of industry. Its remarkable resistance to corrosion, combined with a strength equal to steel, and the readiness with which it is machined, have caused its adoption for countless purposes. In most of these instances monel metal has displayed astonishing superiority over metals ordinarily used. Monel metal is a natural alloy—68 percent nickel, 30 percent copper and the remainder iron and manganese. It never rusts, and for all practical purposes is impervious to acid conditions or superheated steam. Possessing a tensile strength much greater than phosphor bronze, it is at the same time so non-corrodible as to outlast that material in many cases by from 50 to 100 percent. We ship monel metal sheets and rods promptly from our Philadelphia stock. Castings are quickly furnished from customers' patterns. Any individual or business concern wishing to be on our monthly stock list should notify us without delay. *The Biddle Bulletin* will then be sent regularly to the address given. Our illustrated booklet on monel metal will be mailed on request. It contains valuable information."



IN counting the revolutions of engines, turbines, motors, line shafting or the revolving parts of any machine, there is nothing equal to the

STARRETT SPEED INDICATOR

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THE L. S. STARRETT COMPANY 42-147

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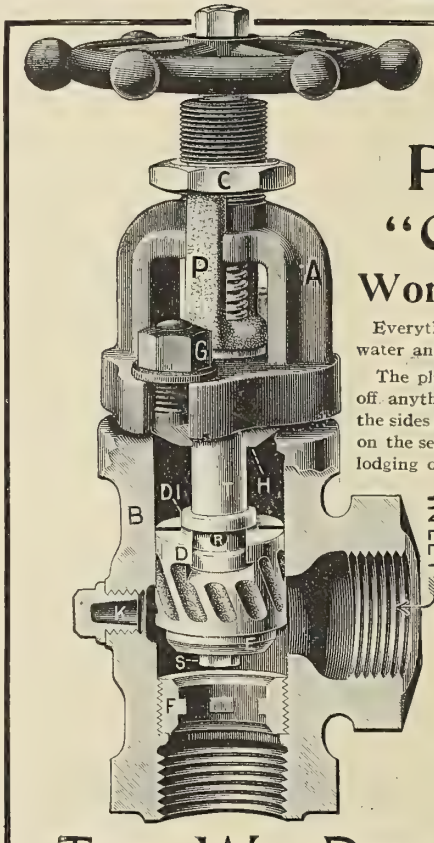

No matter how muddy the water may be, or how much scale passes out with the water, the

Powell "Cyclone" Won't Choke Up

Everything must go out with the water and steam.

The plunger is grooved to scrape off anything that might adhere to the sides of the body, and the bevel on the seat prevents anything from lodging on it.

The Powell "Cyclone" Blow-Off Valve

has more good points than any other blow-off valve on the market today.

We have a circular we would like to send to you—a postal brings it.

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The Owners of British Patents

Nos. 17,932 and 17,935 of 1906, relating to improvements in the manufacture of **Armour Plates for the Protection of Ships and other Steel Objects,** are desirous of disposing of the patents or entering into a working arrangement under license with firms likely to be interested in the same, or they would be open to consider proposals to carry out or use the inventions to fill any requirements of the market in Great Britain on terms to be arranged.

The patents cover inventions interesting to ship-builders and manufacturers of Armour Plating.

Detailed information as to the inventions will be found in the Patent Specifications, of which copies will be supplied to any interested party on request.

Full particulars can be obtained from and offers made (for transmission to the owners) to **Marks & Clerk, 57 and 58 Lincoln's Inn Fields, London, W. C.**

An electric blue-print machine is described in an illustrated catalogue published by the Eugene Dietzgen Company, 218 East Twenty-third street, New York. "You do not have to depend upon time or weather to reproduce your drawings or tracings. It makes no difference whether it is day or night, rain or shine, our electric blue-print machine will give uniform exposure on the sensitized paper, through the equal light radiation in the cylinder."

A steam engine indicator is described in a folder published by the Star Brass Manufacturing Company, 104 East Dedham street, Boston, Mass. "Its simplicity is instantly recognized and its accuracy is the apex of indicator science. Its construction embodies many unique and meritorious features, such as the diameter of the piston, which is one-quarter of one square inch area also, the length of the piston is materially reduced, thereby eliminating friction to a minimum, the reduced area of piston also allows of the use of lighter wire springs, ensuring greater elasticity and marked freedom of operation. The position of the spring is such as to make it readily accessible for quick changes, and the method employed is novel and easily the simplest form produced. By a very novel method of releasing the jam nut under spring the position of atmospheric line is readily adjusted. These instruments have been approved for use on United States Government vessels, and are recommended by the leading mechanical engineers and architects."

A little booklet, entitled *Record Breaking,* has been published by the American Blower Company, Detroit, Mich. This booklet tells of the record-breaking speeds achieved by the United States battleships *Utah* and *Florida* on their trial trips. "Nor are these the only dreadnoughts in the United States navy equipped with our apparatus; the *Delaware* and *North Dakota* carry 'Sirocco' forced draft equipment, and these ships were, until the *Utah* and *Florida* were commissioned, the 'great ships' of the navy. Numerous torpedo boat destroyers, colliers, etc., also carry our fans, to say nothing of the fact that practically the entire British navy and most of the vessels in the other European navies and that of Japan are equipped with 'Sirocco' fans built at Belfast. 'Sirocco' fans would enable you to break all previous records in the economical operation of your boiler plant. Let us figure with you. In any event, let us send you our new Mechanical Draft Catalogue No. 343ME."

The high efficiency of J-M Sea Rings is one of the articles published in the December issue of the *J-M Power Expert,* issued by the H. W. Johns-Manville Company, Madison avenue and Forty-first street, New York. "J-M Sea Rings cannot exert more than 25 percent of the amount of friction that ordinary packings exert on a rod or plunger. In other words, they save 75 percent of the friction—or, rather, power needed to overcome the friction—that is always present where ordinary packings are used. This statement is based on the fact that J-M Sea Rings do not grip or press against the rod except when there is a tendency to leakage or pressure through the box; and then their pressure against the rod is in exact proportion to the pressure against the packing. J-M Sea Rings, therefore, do not press against the rod during the entire forward stroke of an engine when the steam is back of the piston. On the return stroke their pressure drops from the maximum pressure at the beginning of the return stroke to nothing at the end of the stroke, or one-half the amount of pressure against the rod that ordinary packings exert."

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The largest dreadnought attending the Coronation of King George V.

This Battleship is Equipped with

Lytton Steam Traps

Manufactured by

Lytton Manufacturing Corporation

Main Office and Works:
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A chain hoist with a patented loop hand-chain guide that protects the working parts and adds to its safety, is described in a catalogue issued by the Ford Chain Block & Manufacturing Company, 143 Oxford street, Philadelphia, Pa. "This is the only block that carries a five-year guarantee."

Inclined elevators—continuous motion carriers—which meet every condition of freight transportation from level to level, and which are particularly adapted to the quick and economical handling of freight on steamship docks and piers, and in storage warehouses, freight stations, etc., are described in a catalogue published by the Otis Elevator Company, Eleventh avenue and Twenty-sixth street, New York. Without obligation of any kind the Otis Elevator Company's engineering department will submit plans and estimates of equipment and operation cost of the types best adapted to your requirement. The company states, "Put your freight-moving problems up to us—we offer you a real help and a positive solution."

"Submarine Signals" is the title of a 38-page book published by the Submarine Signal Company, 88 Broad street, Boston, Mass. "After fourteen years of experiment it has been demonstrated that the submarine signal receiving system which we furnish is the only satisfactory one which has been devised. It is an all-water system; that is, receiving tanks filled with water are provided inside the ship to receive the sound coming through the water outside the ship. This principle of receiving submarine signals is fundamental and is fully covered by our patents. To those interested in a more technical discussion of the various methods of receiving submarine signals and their relative efficiency we will gladly forward our special pamphlet, which explains the merits of our all-water system more fully."

The cofferdam for the Government ship lock located at Black Rock Harbor is described in illustrated Bulletin No. 103, published by the Lackawanna Steel Company, Lackawanna, N. Y. "This bulletin on the greatest steel sheet piling work ever undertaken describes in minute details every stage of the cofferdam work, from the preliminary piling tests to the pulling of the piling after the completion of the lock. The engineering features of this work, as discussed herein, offer interesting and useful hints to every engineer or contractor who may have occasion to use steel sheet piling. The chapters containing reports on installation and tensile tests under Government supervision further show conclusively why Lackawanna steel sheet piling enjoys unquestioned supremacy where great strength and easy driving are essentials. Altogether this bulletin is important enough to warrant most careful reading, so send your address for a free copy."

The Morse valve reseating machine, made by the Leavitt Machine Company, or the improved Dexter machine the company now makes, has been used for many years by the Pittsburg Steamship Company, the Southern Pacific Company, the United Fruit Company, the Cleveland Cliffs Company, the Providence Steamship Company, by the British Admiralty, and, in fact, by the merchant marine and the navies of many countries. The manager of one of the largest shipbuilding works in the world stated recently, "Although there are many things useful on board ship, there is nothing more useful, more essential, or better known by marine and naval engineers, or better liked, than the Dexter machine for repairing valves. This machine is fully described and illustrated in Catalogue I-15, a copy of which should be in the hands of every marine engineer, shipbuilder, naval architect and shipowner. It is published by the Leavitt Machine Company, Orange, Mass. A copy will be sent free upon request.

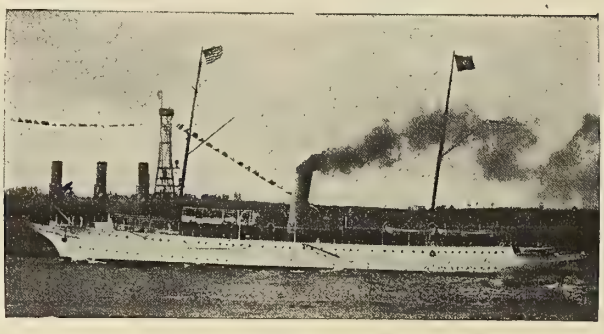
Steam turbines are the subject of a bulletin published by the Connecticut Turbine Manufacturing Company New London, Conn. The special points of superiority claimed by the manufacturer of these turbines are as follows: "A designer, long experienced in the 'small turbine' field, formerly associated with four prominent turbine builders. An improved system of steam distribution and bucketing, efficient and compact in form. Rugged symmetrical design throughout, with liberal shafts, bearings and parts. Flowed bronze wheel buckets, non-destructible, the entire wheel rim in one piece. Flowed bronze return buckets, non-corrosive, in sections detachable from case. Metallic shaft packing water packed and tight at all pressures. A compensating governor, simple, and governs as close as you like. Governor motion bearing ring oiled, which operates the emergency stop if allowed to go dry. An emergency stop, simple and effective, adjustable to different speeds. Absolute lack of oil cups or similar devices that require attention. Interchangeable parts of selected materials most suitable for the duty."

TERRY

1912 Proved the Superiority of

TerrY TurbineS

for Marine Work



President's Yacht "Mayflower" in New York Naval Review, equipped with Terry Forced Draft.

as well as stationary work.

¶ What better fact could you wish for backing up this statement than this? On the United States warships which passed President Taft in New York Harbor Naval Review of last October, and on the miscellaneous ships which stood nearby, there were considerably over 100 Terry Turbines. These are used for driving forced draft fans, electric lighting generators, boiler feed pumps, and ballast pumps.

¶ Forced draft sets also installed on vessels of the British and Chinese Navies.

¶ The diversity of uses of the Terry Turbine on shipboard has increased during the past year.

¶ The complete success of the Terry Turbine on shipboard has been due in brief to absolute reliability because of simplicity of construction; unusually small space occupied; freedom from repairs; comparatively light weight, and lack of vibration.

Bulletin No. 16 Awaits Your Request.

THE TERRY STEAM TURBINE CO.

Home Office and Works: Hartford, Conn.

Gen. Sales Office: 90 West St., New York

British Agents, Yarrow & Co., Ltd.

Scotstown, Glasgow

(32-130)

A large and handsome catalogue will be sent upon receipt of 10 cents in stamps, to pay postage. by the Gas Engine & Power Company and Chas. L. Seabury & Company, Con., Morris Heights, N. Y. This company has had twenty-five years' experience in marine construction, and the catalogue should be in the hands of every person interested in engines and boilers.

"Sirocco" mechanical draft fans for marine use are described in publication 343-M E., published by the American Blower Company, Detroit, Mich. The statement is made that these fans will furnish more draft with less power than the ordinary steel plate fan of twice the size.

Direct-connected generating sets for marine purposes are the subject of a catalogue published by Engberg's Electric & Mechanical Works, 5 Vine street, St. Joseph, Mich. These sets are especially guaranteed as to rating, stability and performance, and also to be of the highest development in this line of equipment.

"Toch's Steel Paint Specifications" is the subject of a catalogue issued by Toch Bros., 320 Fifth avenue, New York. "For over two decades red lead has been used on ships of the United States navy. The superdreadnought *New York* was the first ship to use a better paint on the steel hull below the waterline. It was painted with a foundation priming, anti-corrosive coating of Tockolith."

The multiplex slide rule is described in a folder published by the Eugene Dietzgen Company, 218 East Twenty-third street, New York. "The multiplex will save time and annoyance, as it is constructed upon correct mechanical principles. In addition to being made from carefully seasoned and selected stock, assembled and finished by skilled men, it has an automatic adjustment which renders it for all practical purposes perfect."

"File Filosophy" is the title of a booklet published by the Nicholson File Company, Providence, R. I., a copy of which should be in the hands of every user of files. In the manufacture of this company's files is used "the best steel made for the purpose, correctly tempered and made by expert workmen, directed by forty-nine years' experience. Nicholson files, made in 3,000 styles and sizes, are absolutely unexcelled in cutting power, durability and uniformity."

Instructions for stopping leaks in screw-thread pipe joints are given in a folder published by the Smooth-On Manufacturing Company, Jersey City, N. J.

"Keystone Grease" is the title of an illustrated booklet published by the Keystone Lubricating Company, Department V, Philadelphia, Pa. "This booklet comprises a general treatise on the several densities or consistencies of Keystone grease. It outlines and describes the difference between their general make-up as well as thoroughly designating the general class of machinery which each one is physically appropriate to lubricate. There is also described the proper and correct method by which each density should be used and applied to the various classes of machinery bearings. Correct application contributes very considerably to the achievement of maximum good results from the use of Keystone grease; so we, therefore, earnestly impress upon the engineer or person intending to test or use Keystone grease the importance of reading over, thoroughly, this booklet and applying the grease according to instructions."

TRADE PUBLICATIONS

GREAT BRITAIN

Shirley's patent inclined stabilizing planes for ships are described in a circular published by Frederick Shirley, 151-A Hillington street, Kennington, Park, London, S. E. The application of these stabilizing planes to passenger steamers and smaller vessels will neutralize the tendency to sea sickness and prevent the cargo from shifting, which is always liable to occur through pitching and rolling in a rough seaway. When applied to destroyers or torpedo boats they will have a marvelously steady power, enabling the guns to be more accurately laid and in accelerating the speed due to the planes holding up the foremost part of the vessel, and by keeping the propeller submerged racing of the engines will be eliminated. The greater velocity of the vessel through the water will materially increase its stability by the rush of water imprisoned under the planes forming a cradle of one, two, three or four stages, according to the number of planes used. The vessel may then be assumed to be gliding in this cradle, formed by the water trapped under the inclined planes, giving the vessel rigidity unobtainable by any other method. These stabilizing planes can be easily fixed to any ship."

COBBS HIGH PRESSURE SPIRAL PISTON

And VALVE STEM PACKING

IT HAS STOOD THE TEST OF YEARS AND NOT FOUND WANTING

IT IS THE MOST ECONOMICAL AND GREATEST LABOR SAVER

WHY? Because it is the only one constructed on correct principles. The rubber core is made of a special oil and heat resisting compound covered with duck, the outer covering being fine asbestos. It will not score the rod or blow out under the highest pressure.

NEW YORK BELTING AND PACKING CO. LIMITED

91 and 93 Chambers Street, NEW YORK

LONDON, E. C., ENGLAND, 11 Southampton Row

CHICAGO, ILL., 130 WEST LAKE STREET
ST. LOUIS, MO., 218-220 CHESTNUT STREET
PHILADELPHIA, PA., 821-823 ARCH STREET
SAN FRANCISCO, CAL., 129-131 FIRST ST., OAKLAND
BOSTON, MASS., 232 SUMMER STREET
PITTSBURGH, PA., 420 FIRST AVENUE
PORTLAND, ORE., 40 FIRST STREET
SPOKANE, WASH., 157 S. MONROE STREET

High-speed gear hobbing machines are described and illustrated in a 48-page catalogue, published by Humpage, Thompson & Hardy, Jacob street, Bristol. "Have you ever stopped to think how many gear wheels are constantly running in your machine shop? If you have you must have realized what an important part gearing plays in almost every machine. Suppose for a moment that the teeth of all these thousands of wheels were imperfectly shaped, what would be the result? The noise in your machine shop would be deafening, pointing at once to loss of efficiency, waste of power and greater wear and tear. Are you satisfied that your gears are as silent and efficient as they might be? The rapid and accurate production of silent running gear wheels is a subject which must be of interest, directly or indirectly, to every engineer. What was good enough fifty years ago could not be tolerated in these days of high-speed machinery, and so we can trace a steady evolution of gearing from the time when people were content to use wheels with cast teeth. First came the machine-molded tooth, and next the teeth were cut from the solid blank by means of a single tooth fly cutter. Later still the fly cutter was replaced by a disk milling cutter with machine-relieved teeth, whose form is unchanged by grinding. For a long time the teeth cut in this way were quite good enough to meet all requirements, but the development of high-speed machinery and the ever-increasing demands for silence and efficiency, combined with cheapness, have now made this method out of date. The outcome of these more exacting demands is the gear hobbing machine."

Direct-acting steam pumps for all services and pressures are described in a catalogue of 60 pages published by Clarke, Chapman & Company, Ltd., Gateshead-on-Tyne. "In putting forward our latest designs of direct-acting steam pumps (Woodeson's patent), we wish to call attention to a few of the considerations by which we have been moved. We have fully recognized that a steam pump must be simple, economical and reliable, and have worked to this end; also the vital parts, viz.: the steam valves should be of a form which may be easily made and fitted in any part of the world at a trifling cost. In the latest Woodeson patent pump this has been accomplished, and at the same time maximum economy of steam, under all conditions, has always been kept in mind, and actual results have been fully up to our expectations. We have no hesitation in recommending these pumps for every service where a direct-acting pump can be used, and for boiler feeding we are confident they are without an equal, both as regards reliability, economy and smoothness of working. We are supplying these pumps in daily increasing numbers, both for marine and land services, and records of most satisfactory results are always reaching us. For marine work and for land work, when a condenser is used, automatic float control gear is mostly fitted; and we strongly recommend it wherever it is possible to use it, especially for land work, where its adoption is not as general as it might advantageously be. By this means the water is automatically fed to the boilers as fast as it comes from the air pump, and apart from reducing the amount of attention required the steady feed to the boiler promotes easy steaming."

"Eclipse" electric heaters are described in a 30-page catalogue published by the Electric & Ordnance Accessories Railways Company, Ltd., Aston, Birmingham. "It is no exaggeration to say that electricity is revolutionizing the work of the world. On every hand we come in contact with applications; in industrial, commercial and domestic life, its unseen forces are effecting a miraculous transformation. Its ubiquity is unquestionable, and its pre-eminence, in whatever sphere it is employed, without dispute. Of the many boons which it has bestowed on mankind, the greatest so far is, perhaps, the electric light, which is now to be found in practically every modern household and which is recognized by competent authorities to be superior in every way to all other illuminants. Of recent years electricity has been successfully applied as a heating agent, and the wonderful progress which has been made in this direction is due entirely to the highly satisfactory results which have been obtained. The public is beginning to realize that coal fires, in addition to occasioning much unnecessary work in the household, and being productive of many vexations in the shape of dust, smoke, dirt, etc., including damage to internal decorations, are extremely wasteful, the percentage of the heat developed, which is usefully employed, being extremely small. Gas and steam heaters admittedly pollute the atmosphere and effect its humidity, and without doubt the only method of heating which ensures absolutely pure and wholesome heat being obtained is by the use of electric heaters, in which there is no combustion whatever and from which there are no injurious products to undermine the health and destroy the comfort of those breathing the heated atmosphere."

Engineers! Draftsmen! Superintendents!

You can earn money and help edit International Marine Engineering by writing to us about your own experiences and those of your friends.

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INTERNATIONAL MARINE ENGINEERING

17 BATTERY PLACE, NEW YORK

"Disc Grinding" is the title of a catalogue published by Perkins & Company, Ltd., Lord Street Engineering Works, Leeds. "The use of disk grinders is rapidly developing as their wonderful time and labor-saving properties become more widely known and appreciated.. The ordinary emery wheel machine requires no argument to ensure for it a place in every workshop. Its adaptability for rough shaping at a fraction of the cost of filing is familiar to everyone. There is, however, in every shop an immense amount of work for which the ordinary emery machine is of no use. Such work is generally finished by milling or shaping, followed by draw-filing, or scraping to a surface plate, with heavy expenditure of time and labor. This work can almost invariably be done more perfectly, and in a fraction of the time, by means of a disk grinding machine, which is practically a rotary fire, traveling at 2 miles per minute. The steel disks can be run at double the speed at which it would be safe to run an emery wheel."

Diesel Engine Company, Ltd., General Buildings, Aldwich, London, W. C., has issued a circular called "Last Word in Power Production." "The Diesel engine, now universally recognized as the most efficient type of internal-combustion engine, owes its development in this country to the Diesel Engine Company, Ltd., London—the original owners of the patents taken out by Dr. Rudolf Diesel in 1892. The success of this engine has been almost phenomenal, owing to the fact that it uses cheap fuel oil in such small quantities that it competes favorably with every other form of motive power. The sources of supply of this cheap fuel oil have abundantly increased within the last few years, and it can now be obtained in almost every part of the world where power is required. Owing to large developments in the oil fields of the world, particularly in America, Mexico, Chili, Russia, Borneo, Burmah, Persia, and more recently in Egypt, it is evident that the supply will for many years be equal to the demand, and no fears of a shortage and consequent increase in price need be contemplated. Within the comparatively brief period which has elapsed since the Diesel engine was first placed on the market its progress, notwithstanding the opposition and conservatism with which a new invention has to contend, has been remarkable, and at the present time engines aggregating more than 600,000 brake-horsepower are in use. The results of tests show that the consumption of fuel oil in the Diesel engine is 0.40 pounds per brake-horsepower-hour in the larger, and 0.46 pounds in the smaller sizes, and in actual practice it is proved that this excellent figure is maintained under working conditions. With oil at 40s. per ton the fuel costs are .09 pence per brake-horsepower per hour, or 0.126 pence per kilowatt per hour."

Machine tools are described in a 40-page catalogue published by Tangyes, Ltd., Cornwall Works, Birmingham. In submitting this catalogue of machine tools, Tanges, Ltd., would like to draw attention to the substantial character of the tools shown. They were among the first to make an exhaustive study, and carried out a long series of tests, with a view to the manufacture of machine tools to meet the present-day requirements of high-speed steels, etc. As is well known, to give good work a machine tool must be not only accurate in regard to its dimensions, but substantial in its construction, to eliminate as far as possible vibration, which is so destructive to the tool. The power that is required bears an almost direct proportion to the amount of metal removed—kind for kind—and it will be readily seen that machines should of necessity be of stronger and stiffer construction, if only on account of the power that is passed through them in dealing with the heavier cuts. It is also the opinion of many that high-speed steels have not yet reached a stage of finality, and it is well in putting down new machines to ensure that they are of substantial construction, and so avoid, as far as possible, expensive replacements in keeping pace with such developments. Tanges, Ltd., have exceptional facilities for producing machine tools of a satisfactory character, in that they are manufacturers of a wide range of machinery, and have their machines constantly under their own supervision in working conditions, and are enabled to embody such points as are of actual service without introducing too much *finesse* into their construction, which latter often proves a disadvantage in actual use and tends to weaken the machine. Tangyes, Ltd., would like to add that (under the names of Tangyes Machine Tool Company, Ltd., and The Tangye Tool & Electric Company, Ltd.) they have been manufacturers of machine tools for over forty years, and as they are constantly revising and improving their standard designs to bring them up to modern requirements, they invite inquiries for all kinds of heavy machine tools for railway and engineering establishments."

WELIN MARINE EQUIPMENT COMPANY

305 VERNON AVENUE, LONG ISLAND CITY, N. Y., U. S. A.

Life Boats ***Welin Quadrant Davits*** ***A. B. C. Life Preservers***

BOATS

DAVITS

On the above ship will be noticed the American Flag — a rare sight, but it is a universal sight to see ships under all flags, equipped, as this one is, with WELIN QUADRANT DAVITS and OUR LIFE BOATS

Thousands of both are in use because they are the Best: It's Better to be Safe than Sued

London House: *The* Welin Davit and Engineering Company, 5 Lloyds Avenue

Valves of every descripton, for water, steam and air, are described in catalogues issued by Alley & MacLellan, Ltd., Glasgow.

Fittings and tools for steam, water and gas are described in a profusely illustrated catalogue of 180 pages, published by E. Bennett & Son, Ltd., Aldgate, East Chambers, London, E. "In compiling this catalogue it has been our aim to present as fully as a book of this size permits all the fittings required by a pipe fitter, but should it happen that you can find no illustration of your special requirement, please send us a specification and we would be pleased to give you a quotation. We undertake to supply any article in malleable iron, soft cast iron, brass and gunmetal in a finished condition or as a rough casting. Our works are the largest in the world for this special business. They possess practically unlimited facilities for turning out the greatest variety of highest class work of this description. We especially invite in the following, your attention to some of the advantages to be obtained by the uses of these fittings and the few suggestions as to selection."

Patent bevel wheel shaping machines are described in a circular published by Greenwood & Batley, Ltd., Leeds. "These machines are made in three standard sizes for shaping the teeth of bevel and mitre wheels, working from an enlarged copy, or former, of the tooth to be cut, and are extensively used by government departments, gear cutting specialists, machine builders, etc. We have a number of machines in constant operation in our own gear cutting department, which may be inspected at work. The chief characteristic of the machines and their advantage over other types is that they will produce teeth which are theoretically correct in form, and therefore more efficient, whilst they are not restricted to any one particular form of tooth. In their latest form, as herein illustrated, they are fully automatic in all their movements, being equipped with automatic dividing mechanism, and an automatic trip which ensures uniformity in the depth of tooth. The machines require little attention from the operator beyond the fixing of the work and the setting of the tools, so that one workman is able to operate several machines advantageously."

BUSINESS NOTES
AMERICA

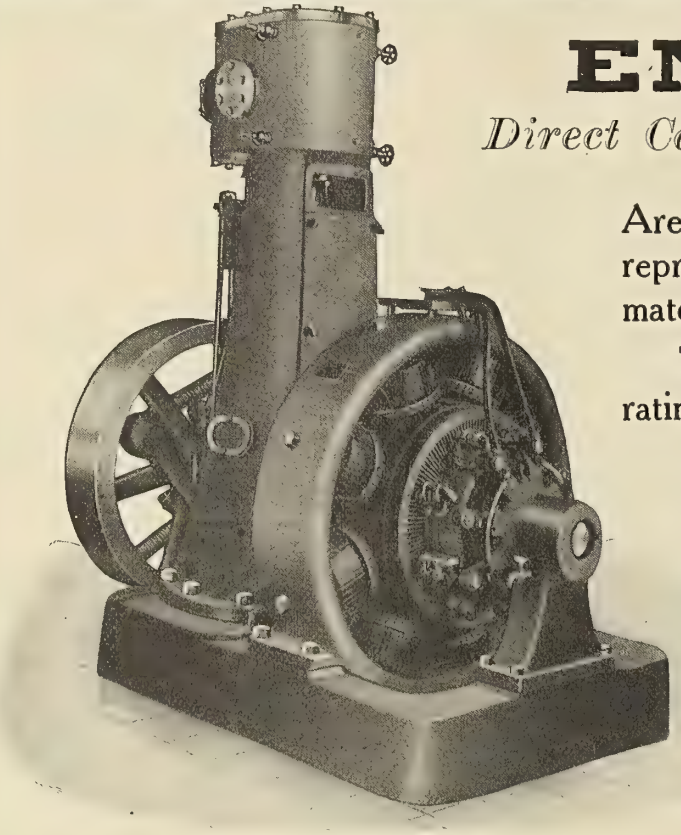
MR. PETER F. FLAVIN, former general salesman for the Monarch Tool Company, from which position he recently resigned, is now connected with the Chicago Pneumatic Tool Company, with headquarters at Birmingham, Ala.

THE INDEPENDENT PNEUMATIC TOOL COMPANY, Chicago, Ill., has appointed Walter A. Johnson manager of its Atlanta, Ga., office, to succeed John J. Keefe, deceased. Mr. Johnson has been connected with the Independent Company's Pittsburg office for several years, and is well equipped to take up his new duties.

AMONG THE VERY RECENT PURCHASES OF TATE, JONES & COMPANY'S rivet forges are the E. Keeler Company, Kennicott Company, American Bridge Company, Hockensmith Wheel & Mine Car Company, Standard Oil Company, Western Gas Construction Company, McMyler Interstate Company and the Lake Shore Engine Works. This company's rivet forges are being shipped all over the world.

J. H. WILLIAMS & COMPANY, 63 Richard street, Brooklyn, N. Y., manufacturer of drop forgings, have opened an office and warehouse at 40 South Clinton street, Chicago, Ill., in charge of Mr. Charles E. Hathaway, who has represented the firm in Chicago for some years. It will be Mr. Hathaway's aim to carry at all times a sufficient stock of Williams' many drop-forged specialties to accommodate the immediate needs of the firm's customers in that part of the country.

THE ANNUAL MEETING of the board of directors of the Independent Pneumatic Tool Company was held in Chicago on Dec. 3. The usual quarterly dividend of 2½ percent was declared payable Jan. 10, 1913, to stockholders of record on Dec. 31, 1912. The annual statement shows an increase in the company's sales of 31 percent over the previous year. In order to meet this increased demand for Thor air tools additional factory buildings are now under construction at Aurora, Ill., which, with equipment, will cost several hundred thousand dollars. Mr. James Buchanan Brady, president of the company, made a special trip from New York to Chicago to attend this meeting.



2½ to 50 Kilowatt

WE ALSO BUILD SEARCHLIGHTS

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Direct Connected Generating Sets

Are superior for marine purposes. They represent perfection in workmanship, material and design.

They are especially guaranteed as to rating, stability and performance, and to be of the highest development in this line of equipment.

Send for descriptive bulletins, testimonials and prices.

Manufactured by

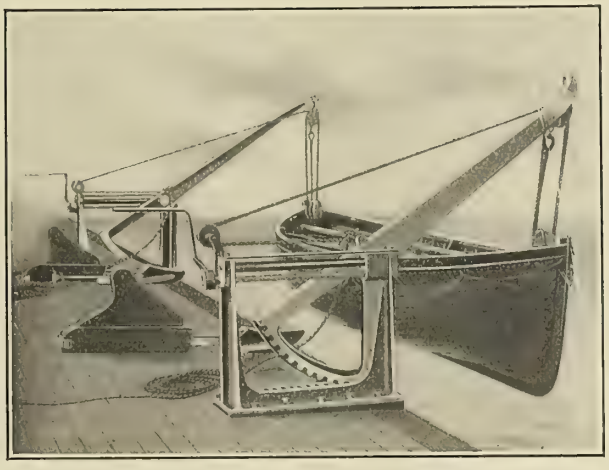
ENGBERG'S
ELECTRIC & MECHANICAL WORKS
5 Vine Street
ST. JOSEPH, MICH., U.S.A.

Welin Marine Equipment Co.
305 Vernon Avenue
Long Island City, N. Y., U. S. A.

BOATS

The problem of providing life boat accommodation under the new laws, perplexes marine people. We are experts in solving this problem.

Send us deck plans and number of persons to be cared for and we will give you estimates on your needs.



We save you weight, and will give you the best that is known in our line. Write us.

Life boats and rafts. Wood working boats.

Get what will really save life.

Better be sure than sued.

DAVITS

Welin Marine Equipment Co.
305 Vernon Avenue
Long Island City, N. Y., U. S. A.

A FREE SAMPLE OF "PALMETTO" PACKING will be sent upon application to Greene, Tweed & Company, 109 Duane street, New York. "Palmetto" packing gives long service under high-pressure conditions because of its great structural strength. The layer upon layer construction of heat-resisting materials gives it the power of endurance. The lubricant in each single strand keeps it soft and pliable. A working sample put to test in your own engine room will convince you. Send for it.

A REDUCTION IN PRICE.—The Joseph Dixon Crucible Company, Jersey City, N. J., makes the interesting announcement that the selling price of its Silica-Graphite "One Quality Only" paint is reduced. The company makes this reduction because the decrease in the price of linseed oil, which is used as the vehicle, enables it to do it, and because it is the company's aim at all times to give customers any benefit possible in reduction of price of materials. "This well-known paint, which has been the standard for nearly fifty years with leading railroads and manufacturing plants as a maintenance paint, is a perfect, long-service protector of all exposed steel and metal surfaces."

MR. W. R. HAYNIE, United States representative of Carels Freres, Ghent, Belgium, the largest exclusive builders of the Diesel engine in Europe, was instructed by the directors to secure for them in America a works manager for the Ghent plant, which plant at the present time is being doubled. After thorough consideration of the matter, Mr. D. G. Baker, works manager of the Olds Motor Works, Lansing, Mich., and who was formerly works manager of the Lake & Knowles Steam Pump Company, Cambridge, Mass., was secured to take this position. Mr. Baker has just returned from a trip to Ghent, where he concluded arrangements and a contract as works manager of Carels Freres' plant at Ghent, and is now preparing to sail to Europe.

THE ALEXANDER MILBURN COMPANY, Baltimore, Md., has just moved to new premises at 1420-22-24-26 West Baltimore street. For some time past the company have been operating under considerable difficulty on account of having insufficient space. Less than two years ago the company increased its space materially by taking in an additional building at the former location on Lombard street, but it is now necessary to seek new and larger quarters. The new premises were purchased in late summer, and have been converted into a most modern building for the factory and offices. The Milburn Company is extensive manufacturers of various kinds of acetylene apparatus, including portable lights, house lighting machines, oxy-acetylene welding and cutting plants and the steam acetylene system for locomotive headlights.

THE STOCK HOLDINGS formerly owned by Mr. Henry Hess, of the Hess-Bright Manufacturing Company, Philadelphia, Pa., in the company, have been purchased outright by the Deutsche Waffen und Munitionsfabriken, Berlin, Germany, Mr. Hess retiring to devote himself to his various other interests. The controlling ownership remains in America in the hands of Mr. T. E. Bright, former vice-president and treasurer, who will direct the future policies. "We are making extremely large additions and improvements to our German works—already the most extensive in existence—also desirable improvements in our facilities for American distribution of a constantly-increasing output. We wish to assure you, in this connection, of our full realization of the importance of unfaltering ambition at all times toward betterment, and that no expenditure of effort or money is being spared to effect advancement in all branches of our business."

NELSON VALVE COMPANY UNDER NEW MANAGEMENT.—The Yarnall-Waring Company, formerly at 1109 Locust street, Philadelphia, Pa., announces its removal to Chestnut Hill, Philadelphia, having assumed the management of the factory and sales of the Nelson Valve Company. The identities of both companies will be maintained as before. The management and officers of Yarnall-Waring Company remain unchanged. The management of the Nelson Valve Company is changed by the following appointments: D. Robert Yarnall, vice-president and general manager; Bernard G. Waring, vice-president and manager of sales. "Hardly enough time has yet elapsed since they assumed control to lay out a definite policy in regard to the complete undertaking. One thing they have decided, however, and decided for all time—that is the quality that has won for Nelson valves their present high standing with the engineering fraternity—their superior design and workmanship shall not be changed in one detail, unless a still further way to improve them can be found."

THE H. W. JOHNS-MANVILLE COMPANY announces the appointment of Mr. C. S. Berry as manager of the Atlanta, Ga., office, located at 31½ South Broad street. To facilitate delivery in the South a stock of roofings, packings, pipe coverings and other J-M asbestos, magnesia and electrical products is carried at this above address. This office also employs a force of workmen experienced in the application of J-M products.

A SATISFACTORY BOILER COMPOUND.—P. A. Meehan, 134 Maiden Lane, New York, has received, among many other testimonial letters, the following from the chief engineer of the New York & Staten Island Electric Company: "Your letter of April 27, in regard to the action of the boiler compound you furnished us, at hand. In reply would say that it has given us satisfactory results. We have tried a great many different kinds of compounds and chemicals to overcome the scale in our boilers, but have been unable to remove same until now. The scale in the boilers was in the neighborhood of ⅛ inch thick, and this was almost entirely removed in a few months with the use of your compound. We are at the present time able to keep the boilers in good shape with very little trouble. We consider your compound a great 'find,' as the water on Staten Island is the worst water for boiler use in the country. If you desire to have anybody see the action of same, I would be pleased to show them the inside of our boilers at any time."

THE ROSS SCHOFIELD COMPANY, 39 Cortlandt street, New York, manufacturer of the Ross Schofield system of circulation for steam boilers, reports a large increase of business during the past six months, within which period the following steamship companies gave orders for the installation of this system in the boilers of their vessels: North Eastern Railway, 2 dredges; Holland-American Line, 4 passenger and 14 cargo vessels; P. & O. Campbell Company, 2 vessels; Gloucester & Sharpness Dock Company, 14 tugboats; Coastwise Transportation Company, collier *Norfolk;* Ward Line steamship *Mexico;* Messrs. W. Cory & Sons, 4 colliers; Spillers & Bakers, 5 vessels; Thos. Harrison, Ltd., 2; New England Coal & Coke Company, collier *Newton;* George Clark, Ltd., 3 vessels; Palmer's Shipbuilding Company, 2; Golden Horn Steamship Company (Constantinople), 8; D. W. Henderson, 2; N. E. Marine Engineering Company, 2; J. P. Corry & Co., 3; Shire Line, 3 cargo and 3 tugboats; American Petroleum Company; Uranium Steamship Company; British India S. N. Company; Great Eeastern Railway; Leetham & Sons, Dunsmuir & Jackson; Richardson & Westgarth; David Rowan & Company; Scrutton & Company; Dublin Steam Trawling Company; Jones & Son; The Severn & Canal Carrying Company; Sirket-Hairie (Constantinople); Frantelli Accan (Genoa); Cassa di Resparuico (Genoa); Fred. Drughorn & Company, one vessel each. In at least ten of these the orders came from previous users of this system, as will be seen by referring to the list of users published by the Ross Schofield Company.

GRADING MANILA FIBER.—One of the features which enter into the individuality of any manufacturer of rope is that of regrading in order that he may get a uniform quality in each of his products. This is made necessary because of the great variety of designations applied to Manila hemp as placed on the market. Because of these variations it is impossible for the manufacturer to combine selections of different marks in the right proportions to give the desired results unless he resorts to regrading. To get this reliability or results requires a thorough knowledge of fibers, a large stock, and special storage facilities. In order that large quantities of fiber may be constantly at hand and proper selection made, the Plymouth Cordage Company, North Plymouth, Mass., has warehouses capable of storing large quantities of fiber for months at a time and maintains a system of fiber examination and classification by its own experts, which, with warehouse records, insure each bale being put to the particular use its quality fits it for. The important question of quality is determined when the hemp first reaches the Plymouth Cordage Company. The carloads of fiber from Boston, New York, Seattle and other ports are brought directly alongside the warehouses, and after the hemp has all been transferred to the platforms every mark is carefully gone over. Bales are opened, the hanks laid out flat, the fiber minutely examined and each mark given a new grading. This examination is conducted directly from the manufacturing standpoint, and is entirely in addition to the one made on the dock as a check upon the commercial grading previously described. The expert ability to judge fiber and the constant care required can be imagined by our readers from the fact that single shipments frequently contain as many as seventy-five marks.

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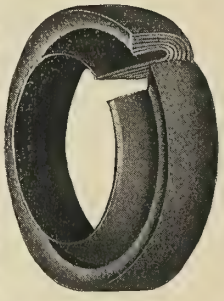

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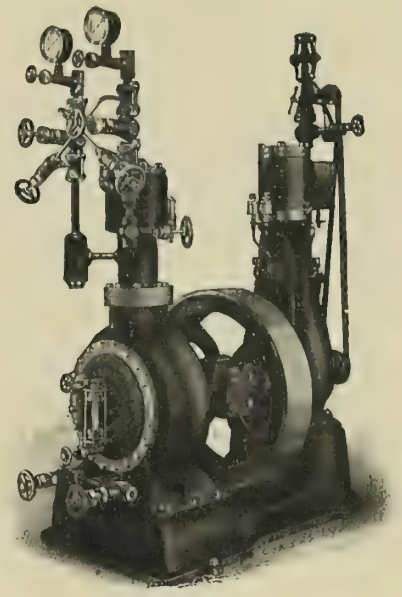

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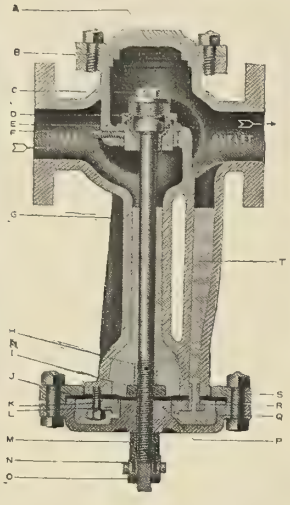

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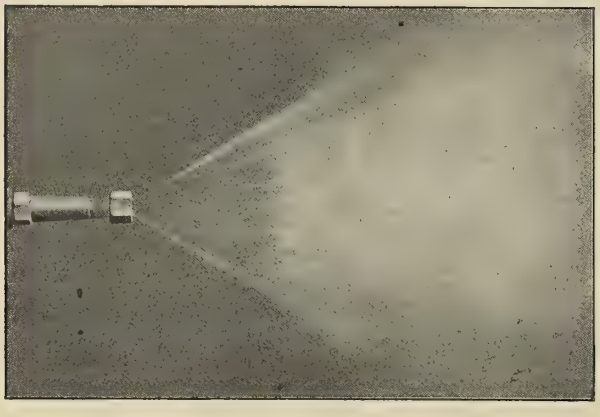

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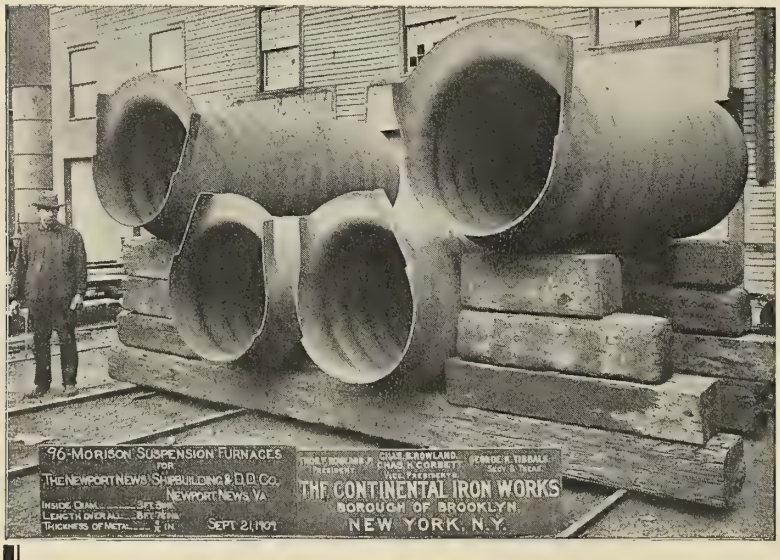

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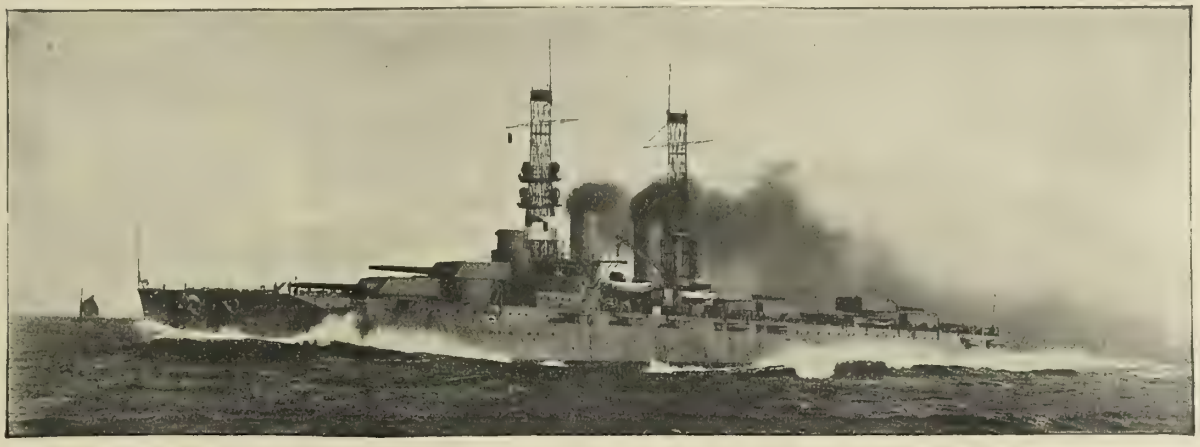

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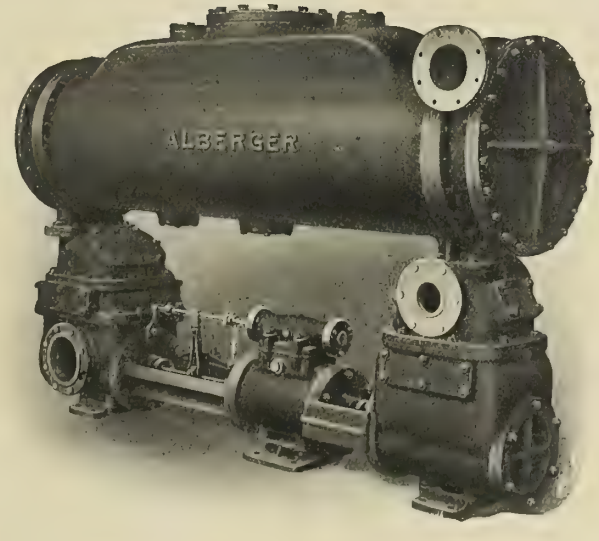

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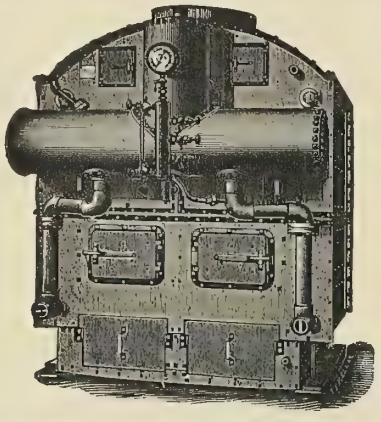

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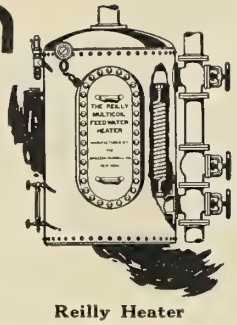

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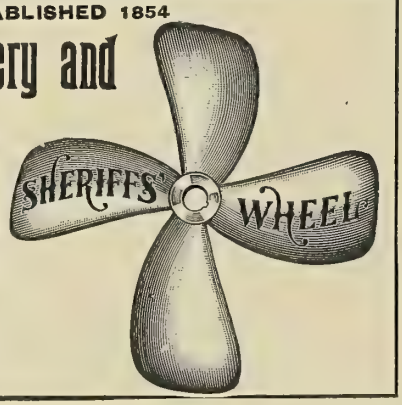

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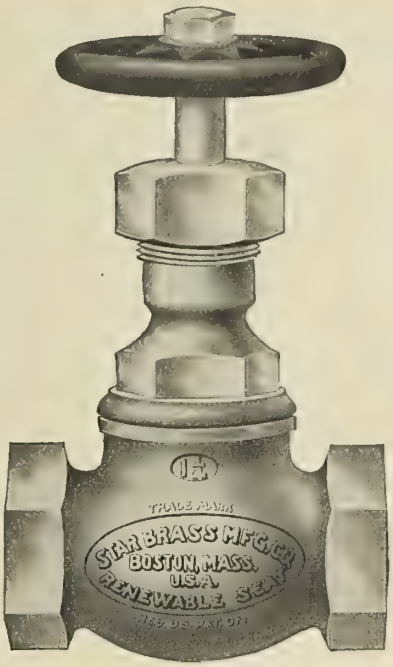

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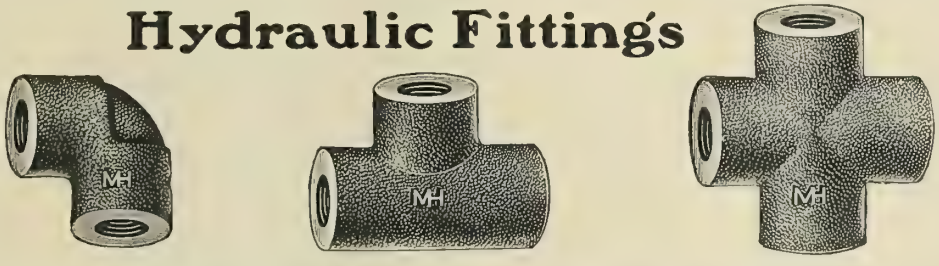

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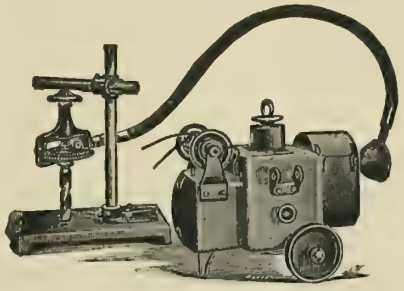

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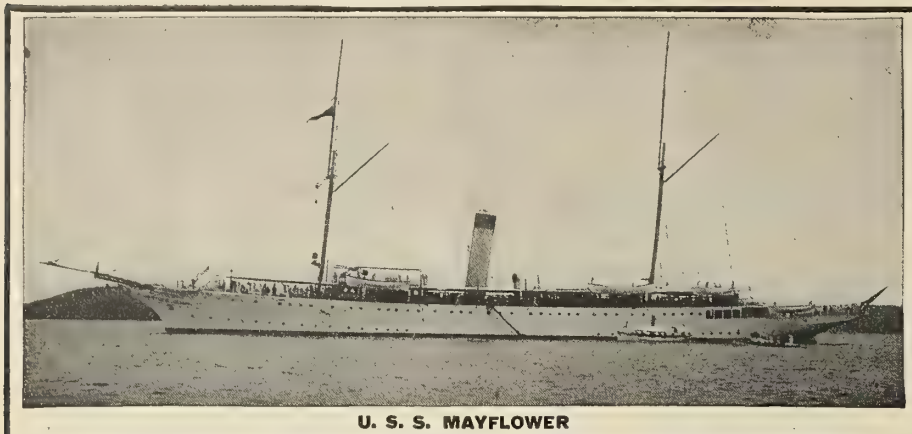

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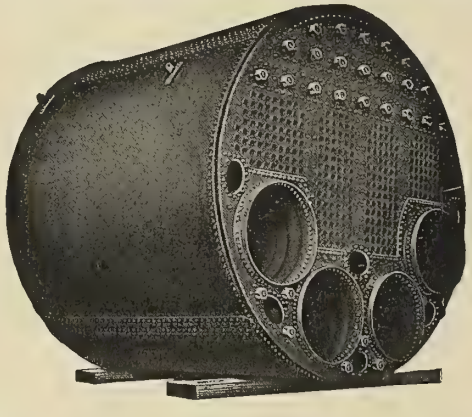

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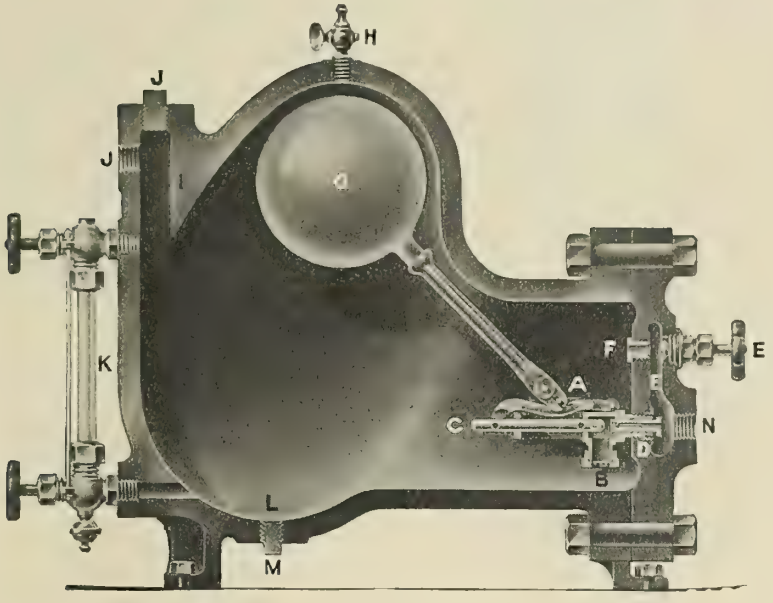

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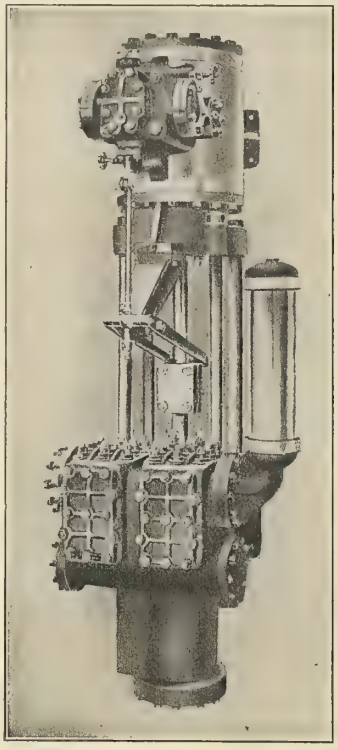

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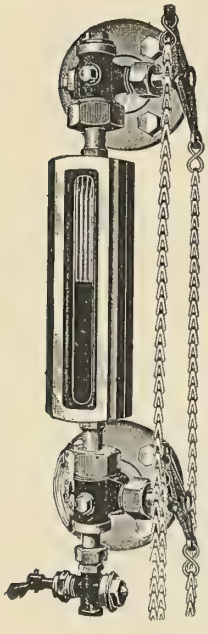

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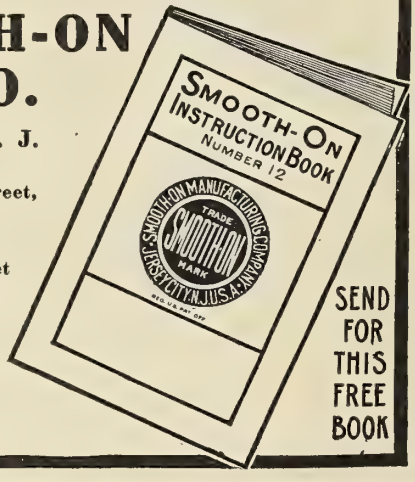

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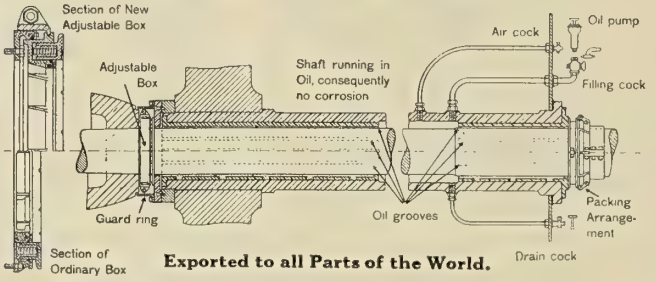

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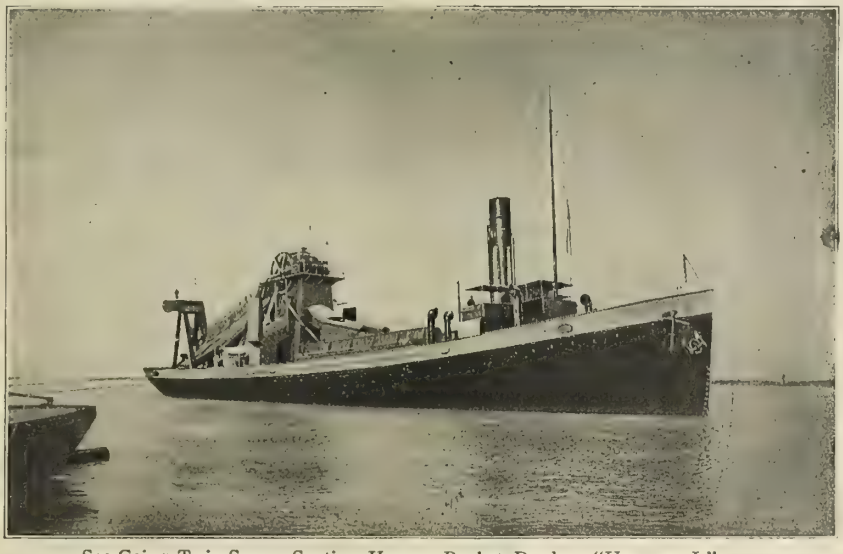

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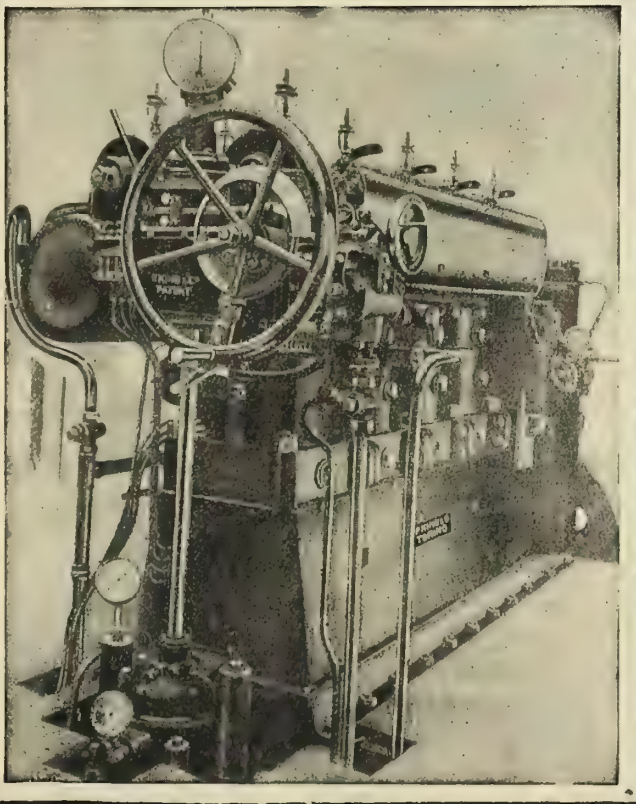

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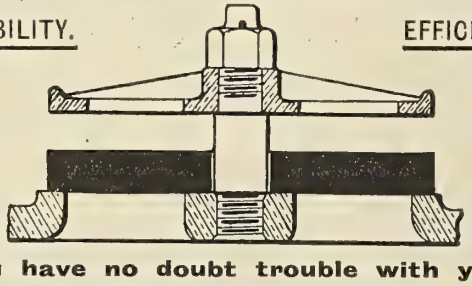

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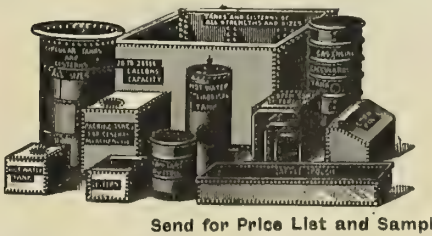

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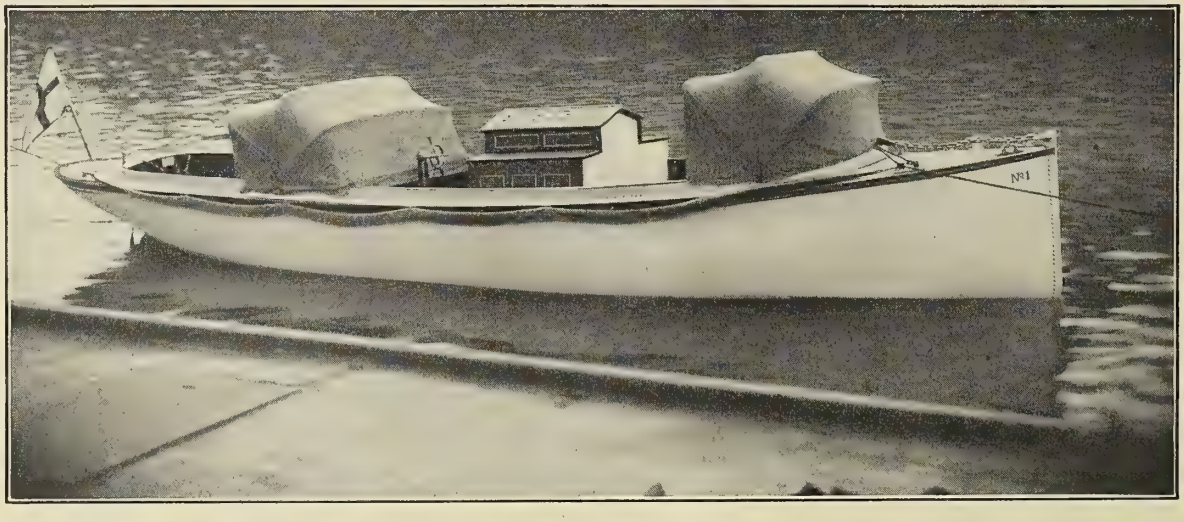

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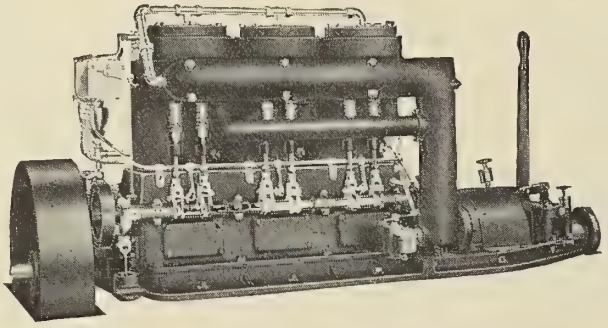

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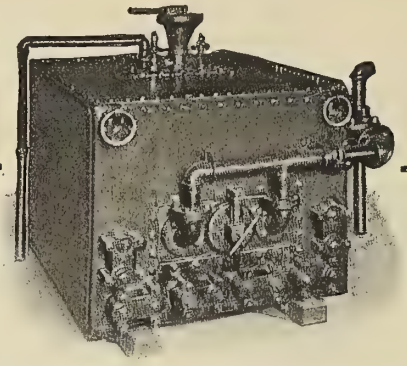

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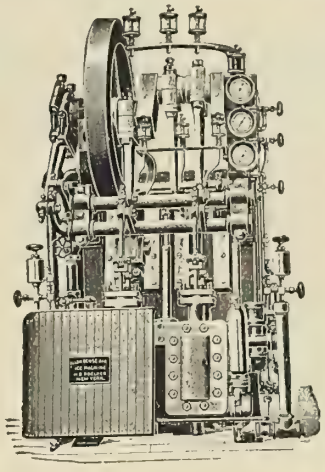

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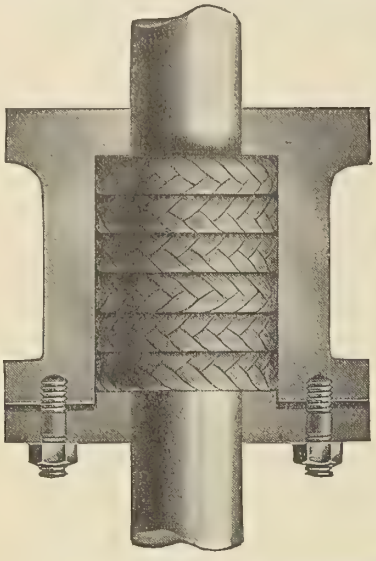

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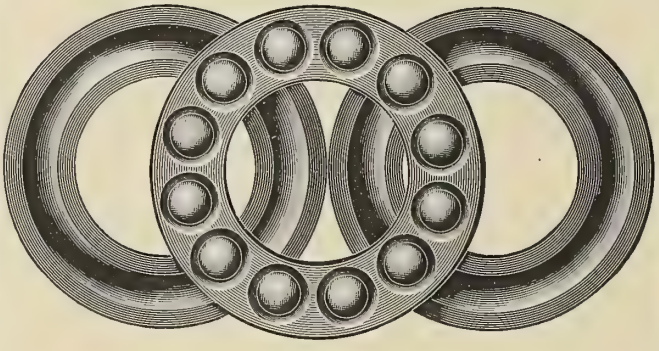

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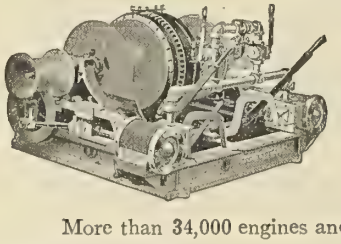

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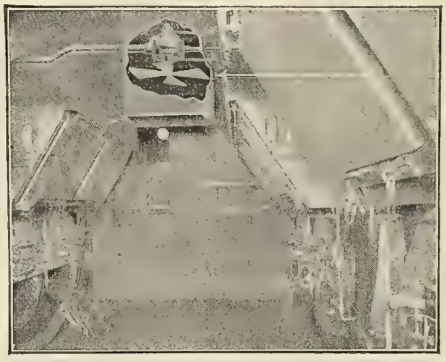

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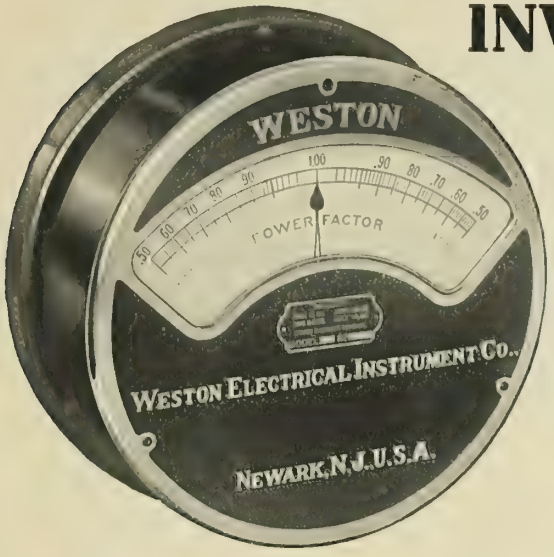

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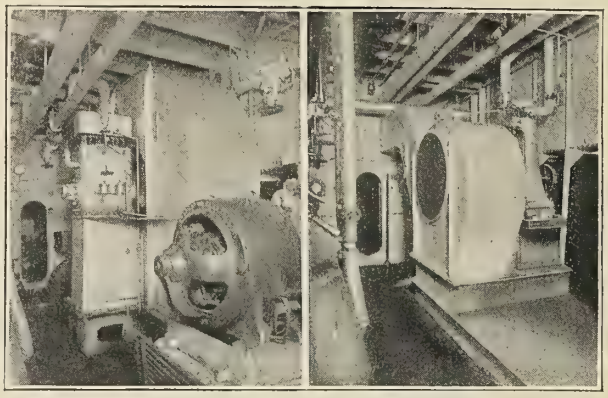

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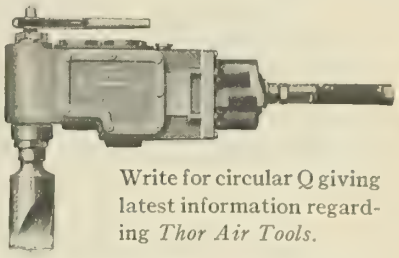

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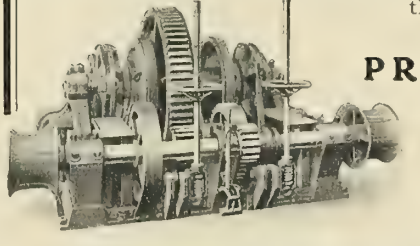

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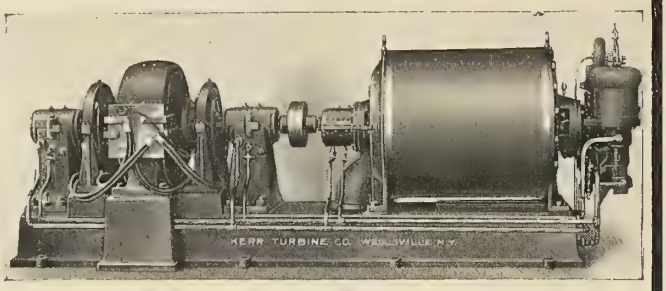

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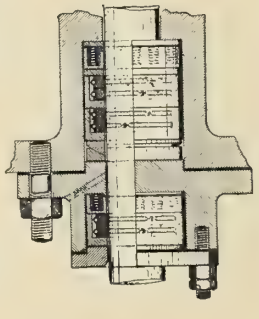

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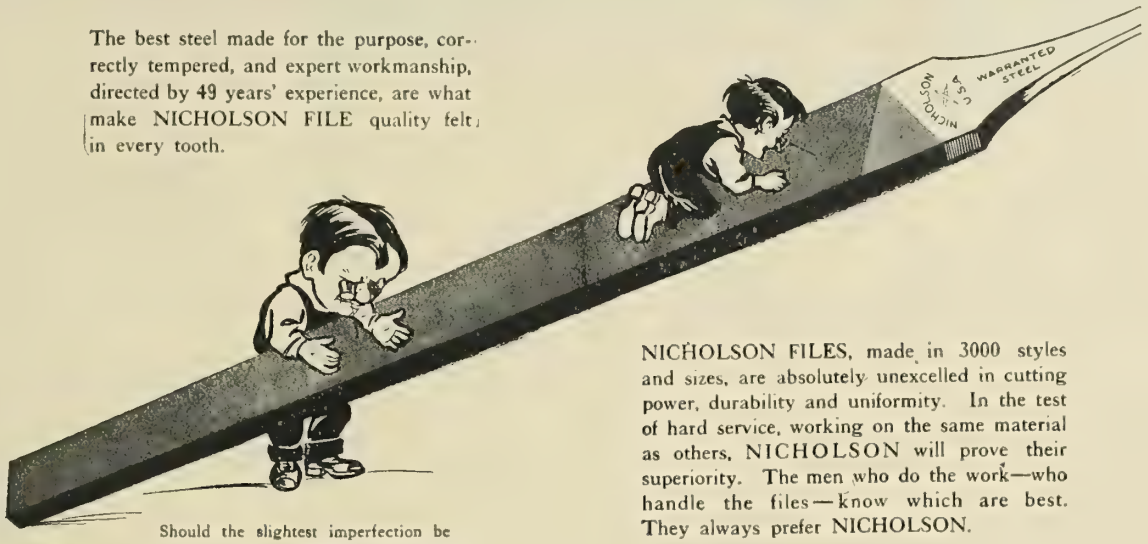

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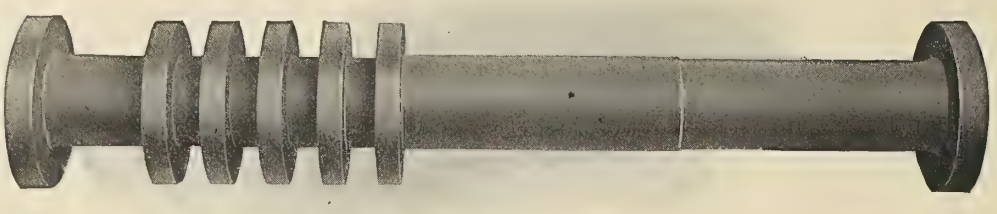

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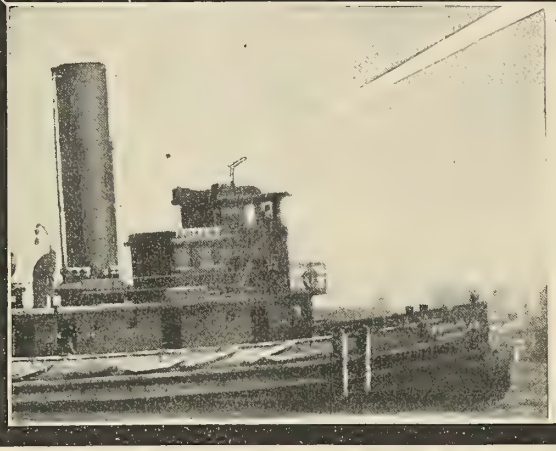

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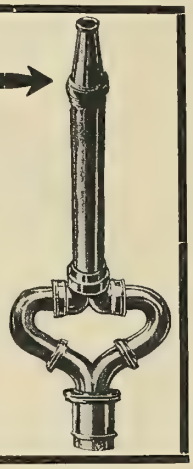

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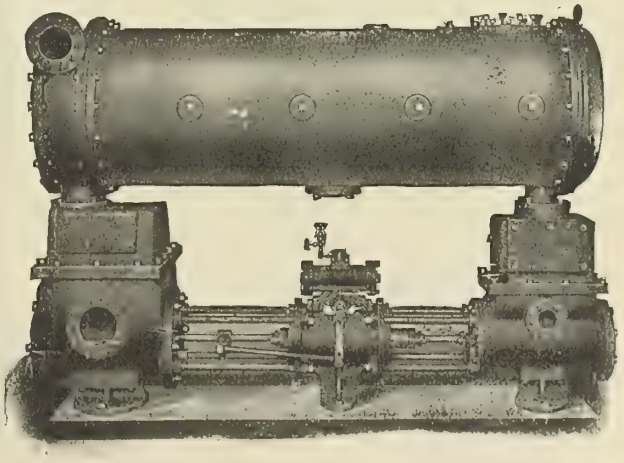

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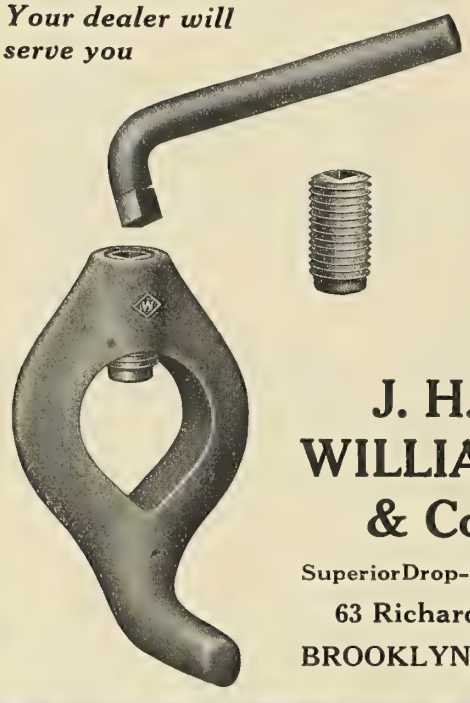

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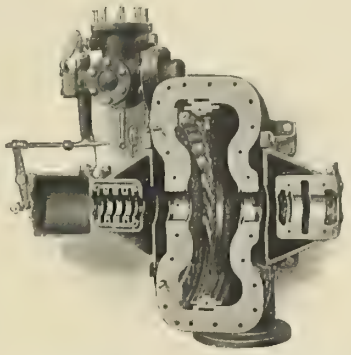

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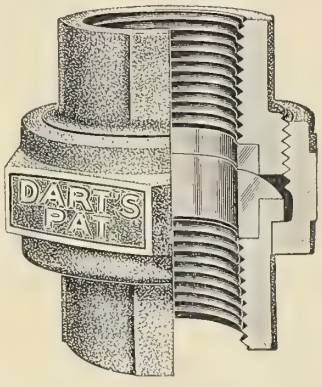

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TRANSMISSION ROPE—See ROPE.

TRAPS—See STEAM TRAPS.

TUBES—See BOILER TUBES; also BRASS AND COPPER.

TUBE CLEANERS—See BOILER-FLUE CLEANERS.

TUBE CUTTERS—See BOILER TUBE CUTTERS.

TUGS—See SHIPBUILDERS.

TURBINES—See STEAM TURBINES.

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WATERTUBE BOILERS—See BOILERS.

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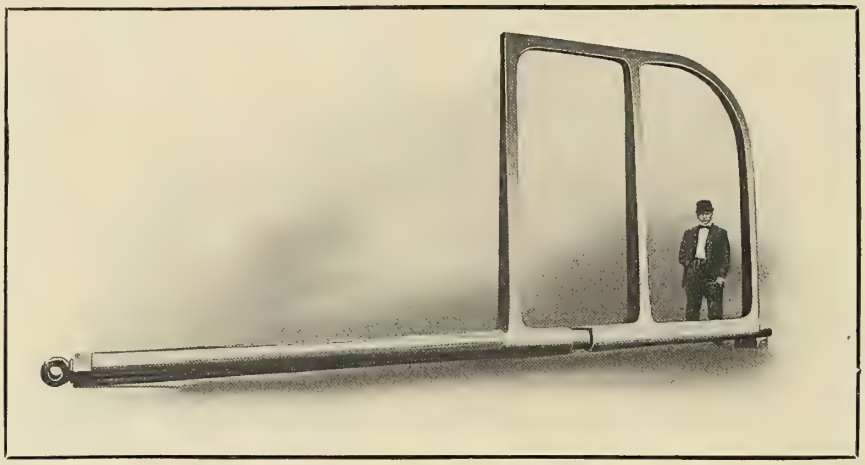

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INDEX TO ADVERTISERS

	PAGES
ALBANY LUBRICATING CO., New York	40
ALBERGER PUMP AND CONDENSER CO., New York	21
ALMY WATER TUBE BOILER CO., Providence, R. I.	22
AMERICAN BLOWER CO., Detroit, Mich	42
AMERICAN BUREAU OF SHIPPING, New York	37
AMERICAN ENGINEERING CO., Philadelphia, Pa	43
ASHTON VALVE CO., Boston, Mass	Inside Front Cover
ASHWELL & NESBIT, London, England	30
ASPINALL'S PATENT GOVERNOR CO., Liverpool, England	—
ATKINSON-FRIZELLE CO., Hoboken, N. J	35
AULD COMPANY, Philadelphia, Pa	20
BABCOCK & WILCOX CO., New York	24
BALDT ANCHOR CO., Chester, Pa	55
BALTIMORE OAKUM CO., Baltimore, Md	53
BANTAM ANTI-FRICTION CO., Bantam, Conn	38
BATH IRON WORKS, Bath, Maine	34
BIDDLE HARDWARE CO., Philadelphia, Pa	39
BLAKE & KNOWLES STEAM PUMP WORKS, New York	26
BOURSE, THE, Philadelphia, Pa	36
BRIDGEPORT MOTOR CO., Bridgeport, Conn	33
BRITISH MANNESMAN TUBE CO., LTD., London, England	30
BROWN, ARTHUR R., London, England	30
BRUNSWICK REFRIGERATING CO., New Brunswick, N. J	19
BRYANT-BERY STEAM TURBINE CO., Detroit, Mich	40
BUTTERFIELD, W. P., LTD., Shipley, England	31
CALLENDER & CO., G. M., LTD., London, England	—
CARELS FRERES, Ghent, Belgium; and New York	38
CARLISLE & FINCH CO., Cincinnati, Ohio	17
CEDERVALL & SONER, F. R., Gothenburg, Sweden	28
COLUMBIAN ROPE CO., Auburn and New York	Below Table of Contents, in Front of Magazine
CONTINENTAL IRON WORKS, Brooklyn, N. Y	20
COOK'S SONS, ADAM, New York	40
CO-OPERATIVE PUBLISHING CO., Baltimore, Md	17
COX & STEVENS, New York	49
CRANDALL ENGINEERING CO., East Boston, Mass	35
DART MFG. CO., E. M., Providence, R. I	50
DAVEY, W. O., & SONS, Jersey City, N. J	50
DAVIDSON, M. T., CO., New York	47
DECKER, DELBERT H., Washington, D. C	55
DE LAVAL STEAM TURBINE CO., Trenton, N. J	49
DEXINE PATENT PACKING & RUBBER CO., LTD., Stratford, London, England	30
DIAMOND POWER SPECIALTY CO., Detroit, Mich	55
DIXON CRUCIBLE CO., JOS., Jersey City, N. J	9
DONNELLY, W. T., New York	33 and 49
DURABLE WIRE ROPE CO., Boston, Mass	37
ENGBERG'S ELECTRIC & MECHANICAL WORKS, St. Joseph, Mich.	14
ECKLIFF AUTOMATIC BOILER CIRCULATOR CO., Detroit, Mich.	52
ERIE FORGE CO., Erie, Pa	46
EUREKA FIRE HOSE MFG. CO., New York	43
FERDINAND & CO., L. W., Boston, Mass	50
FLETCHER CO., W. & A., Hoboken, N. J	34
FORD CHAIN BLOCK & MFG. CO., Philadelphia, Pa	17
FORE RIVER SHIPBUILDING CO., Quincy, Mass	34
FUMIGATING AND FIRE EXTINGUISHING CO. OF AMERICA New York	36

	PAGES
GENERAL ELECTRIC CO., Schenectady, N. Y.	Page facing leading article in front
GREENE, TWEED & CO., New York	Outside Back Cover
GREENWOOD & BATLEY, LTD., Leeds, England	—
GRISCOM-RUSSELL CO., New York	22
H. & M. DIVISION OF TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y.	47
HAYWARD & CO., S. F., New York	46
HEATH & CO., LTD., London, England	—
HUTCHINSON, RIVINUS & CO., Philadelphia & New York	17
HYDE WINDLASS CO., Bath, Me	Inside Front Cover
INDEPENDENT PNEUMATIC TOOL CO., Chicago and New York	43
ISHERWOOD, J. W., London, England	27
JERGUSON GAGE & VALVE CO., Boston, Mass	26
JOHNS-MANVILLE CO., H. W., New York	16
KATZENSTEIN & CO., L., New York	44
KERR TURBINE CO., Wellsville, N. Y.	44
KIND, ING. P., & CO., Turin, Italy	29
KINGSFORD FOUNDRY & MACHINE WORKS, Oswego, N. Y.	24
KRAJEWSKI-PESANT CORPORATION, Havana, Cuba	31
LACKAWANNA STEEL CO., Buffalo, N. Y.	38
LEAVITT MACHINE CO., Orange, Mass	7
LIDGERWOOD MFG. CO., New York	38
LUNKENHEIMER CO., THE, Cincinnati, Ohio	Inside Front Cover
LYTTON MFG. CORP., Franklin, Va	9
McNAB & HARLIN MFG. CO., New York	23
MARINE IRON WORKS, Chicago, Ill	Outside Front Cover
MARINE PRODUCER GAS POWER CO., New York	51
MARVEL, T. S., SHIPBUILDING CO., New burgh, N. Y.	53
MERRILL-STEVENS CO., Jacksonville, Fla	34
MIETZ, A., New York	36
MILBURN, ALEX. C. CO., Baltimore, Md	17
MORSE, ANDREW J., & SON, INC., Boston, Mass	53
MORSE TWIST DRILL & MACHINE CO., New Bedford, Mass	51
MOSHER WATER TUBE BOILER CO., New York	24
NATIONAL TUBE CO., Pittsburgh, Pa	28
NEWPORT NEWS SHIPBUILDING & DRY DOCK CO., Newport News, Va	34
NEW YORK BELTING & PACKING CO., New York	11
NICHOLSON FILE CO., Providence, R. I	45
NILES-BEMENT-POND CO., New York	31
NORWALK IRON WORKS, South Norwalk, Conn	53
OTIS ELEVATOR CO., New York	Inside Back Cover
PARSONS MARINE STEAM TURBINE CO., New York	22
PEERLESS RUBBER MFG. CO., New York	18
PERKIN & CO., LTD., Leeds, England	—

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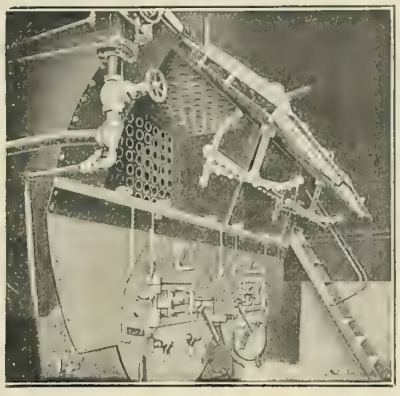

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	PAGES
PHOSPHOR BRONZE SMELTING CO., Philadelphia, Pa	53
PLYMOUTH CORDAGE CO., North Plymouth, Mass	56
POCAHONTAS FUEL CO., New York	32
POWELL, WILLIAM, CO., THE, Cincinnati, Ohio	8
POWER SPECIALTY CO., New York	38
ROELKER, H. B., New York	37
ROSS SCHOFIELD CO., New York	22
SANDS & SON CO., A. B., New York	51
SCHUETTE RECORDING COMPASS CO., Manitowoc Wis	44
SCHUTTE & KORTING CO., Philadelphia, Pa	20
SEAMLESS STEEL BOAT CO., LTD., Wakefield, England	32
SEATTLE CONSTRUCTION & DRY DOCK CO., Seattle, Wash	34
SHELBY STEEL TUBE CO., Pittsburgh (See National Tube Co.)	—
SHERIFFS MFG. CO., Milwaukee, Wis	22
SIMPLEX ELECTRIC HEATING CO., Cambridgeport, Mass	50
SIROCCO ENGINEERING CO. (See American Blower Co.)	—
SIZER FORGE CO., Buffalo, N. Y	54
SMITH'S DOCK CO., LTD., Middlesbrough, England	—
SMOOTH-ON MFG. CO., Jersey City, N. J	28
SMULDERS, F. A., Schiedam, Holland	29
SOTHERN, J. W., London, England	31
STANDARD CHAIN CO., Pittsburgh, Pa	Inside Front Cover
STANDARD MOTOR CONSTRUCTION CO., Jersey City, N. J	33
STAR BRASS MFG. CO., Boston, Mass	23
STARRETT CO., L. S., Athol, Mass	8
STOW MFG. CO., Binghamton, N. Y	23
STURTEVANT CO., B. F., Hyde Park, Mass	21
SULZER BROS., Winterthur, Switzerland	—
TAYLOR INSTRUMENT COMPANIES, Rochester, N Y	47
TERRY STEAM TURBINE CO., Hartford, Conn	10
TIETJEN & LANG DRY DOCK CO., Hoboken, N. J	34
TILLOTSON HUMIDIFIER CO., Providence, R. I	25
TODD, T. S. & CO New York	9
TROUT, H. G., CO Buffalo, N. Y	
UNITED STATES METALLIC PACKING CO., Philadelphia, Pa	53
VROOMAN, S. B. CO., LTD., Philadelphia, Pa	43
WALKER, W. G., & SONS, Edinburgh, Scotland	—
WARD, CHAS., ENGINEERING WORKS, Charleston, W. Va	33
WATERTOWN SPECIALTY CO., Watertown, N. Y	40
WELIN MARINE EQUIPMENT CO., Long Island City, N. Y.	13 and 15
WERF GUSTO, Schiedam, Holland	29
WESTON ELECTRICAL INSTRUMENT CO., Waverly Park, Newark, N. J	41
WHITAKER, MORRIS M., Nyack-On-Hudson, N. Y	49
WILFORD CLOTH CO., New York	9
WILLIAMS & CO., J. H., Brooklyn, N. Y	48
WOLVERINE MOTOR WORKS, Bridgeport Conn	36
ZYNKARA CO., LTD., Newcastle-on-Tyne, England	31

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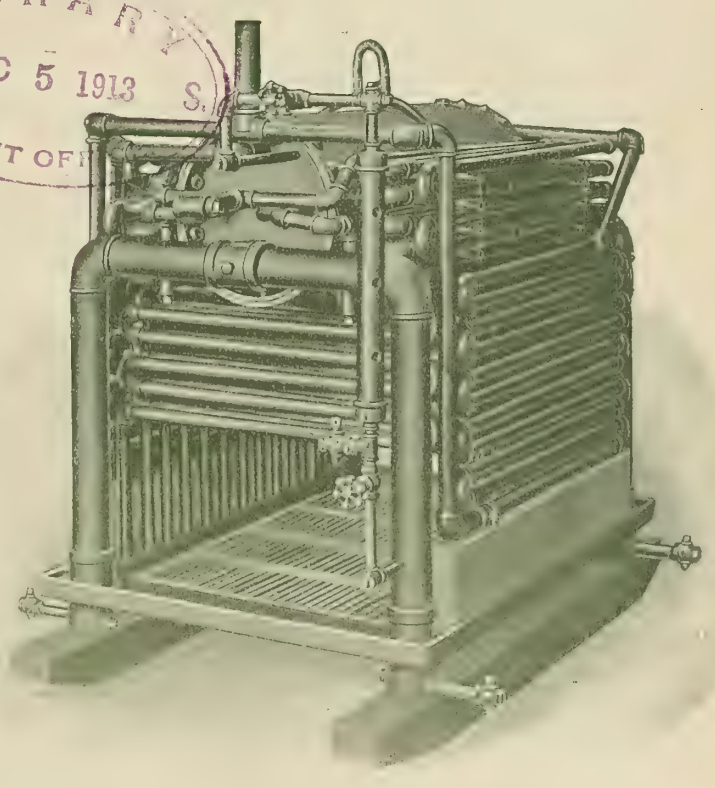

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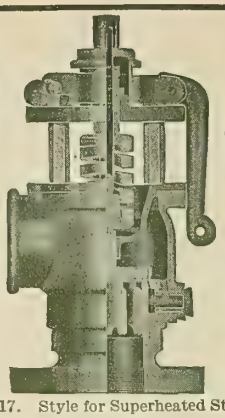

No. 17. Style for Superheated Steam

ASHTON STEAM GAGES

The **ACCURACY STANDARD**

THE ASHTON VALVE CO., Boston, U. S. A.
NEW YORK St. John's House, London, Eng. CHICAGO

The Battleship "TEXAS," now under construction for the United States Navy, will be equipped with

Steam Windlass, Steam Steering Engine and Screw Gear, Steam Coaling Winches, Electric Capstan, Electric Winch and Ash Hoist Engines

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HYDE WINDLASS COMPANY, Bath, Me.

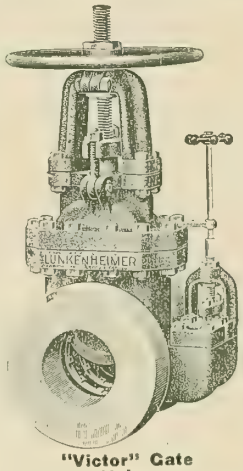
This Company is also furnishing Windlasses, Steering Gears and other Auxiliaries for the Battleships "MORENO" and "RIVADAVIA," now under construction in this country for the Argentine Republic.

DURABILITY AND STRENGTH

combined with the most improved design and high grade workmanship make

LUNKENHEIMER IRON BODY VALVES

the leaders of their line.



"Victor" Gate Valve

The iron used is made according to our own formula and has a tensile strength of 25,000 pounds per square inch.

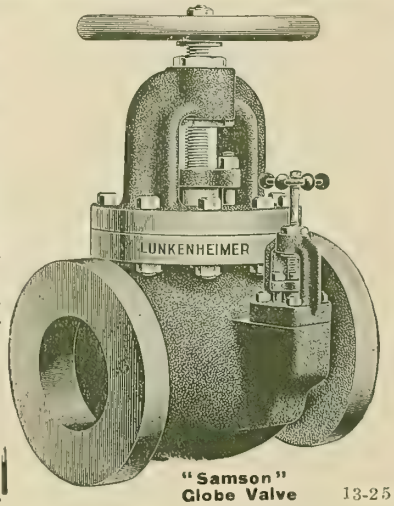
All parts subjected to wear are renewable and are made of a good grade of bronze composition containing a high percentage of copper and tin.

The line consists of Globe, Angle, Cross, Check, Gate, Pop Safety, Relief, Blow-off, Non-return Safety Boiler Stop Valves, etc.

They are made in all standard sizes, and in several weights, the heaviest being for working pressures up to 250 pounds.

For superheated steam and severe service these valves can be had made of "Puddled" Semi-steel, having a tensile strength of 35,000 pounds per square inch, or for extreme conditions of service, pressure and superheat, they are made of Cast Steel, the tensile strength of which is about 80,000 pounds per square inch.

Specify and insist upon securing genuine Lunkenheimer make. Do not accept substitutes—they are never as good as the genuine. Your local dealer can furnish them; if not, write us.



"Samson" Globe Valve

Write for Catalogue.

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13-25

International Marine Engineering

DECEMBER, 1913

CONTENTS

		PAGE
FIVE-MASTED AUXILIARY SAILING SHIP FRANCE. Illustrated	F. C. Coleman	505
ANNUAL REPORT OF LLOYD'S REGISTER OF SHIPPING FOR THE YEAR 1912-1913		510
PANAMA CANAL TOLLS		511
FERRYBOAT SOUTH JACKSONVILLE. Illustrated		512
TURBO-GENERATOR SETS FOR THE GREAT NORTHERN STEAMSHIP MINNESOTA. Illustrated		514
STEAM YACHT CYPRUS. Illustrated		515
BALLIN SECTIONAL WATERTUBE MARINE BOILERS. Illustrated	J. B. C. Lockwood	517
PROGRESS OF NAVAL VESSELS		519
PROGRAMME OF NAVAL ARCHITECTS' MEETING		519
ELECTRICALLY-DRIVEN CARGO BOAT TYNEMOUNT. Illustrated	C. van Langendonck	520
THE CALIFORNIA, AN 11,000-TON MOTOR SHIP. Illustrated	R. C. Wilson	523
OLD-TIME WAR VESSEL ON THE GREAT LAKES. Illustrated	Neil Wilber and Landis Isaacs	524
McANDREW'S FLOATING SCHOOL. Illustrated	Captain C. A. McAllister	530
NOVEMBER STORM ON THE GREAT LAKES		533
MOTOR TOWBOAT BREAKWATER. Illustrated		534
FRENCH LINER LUTETIA. Illustrated		535
TOWBOAT CHARLES P. GREENOUGH. Illustrated		536
LETTERS FROM PRACTICAL MARINE ENGINEERS:		
Broken Bottom End Bolt		537
A Condenser Overhaul. Illustrated		537
Collision of the Colmar and Mavis. Illustrated		537
The Batti Wallahs Society		538
"Hand Drilling"		538
MARINE ARTICLES IN THE ENGINEERING PRESS		539
ENGINEERING SPECIALTIES. Illustrated		541
SELECTED MARINE PATENTS. Illustrated		544

LONDON
CHRISTOPHER STREET
FINSBURY SQUARE, E. C.

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17 BATTERY PLACE

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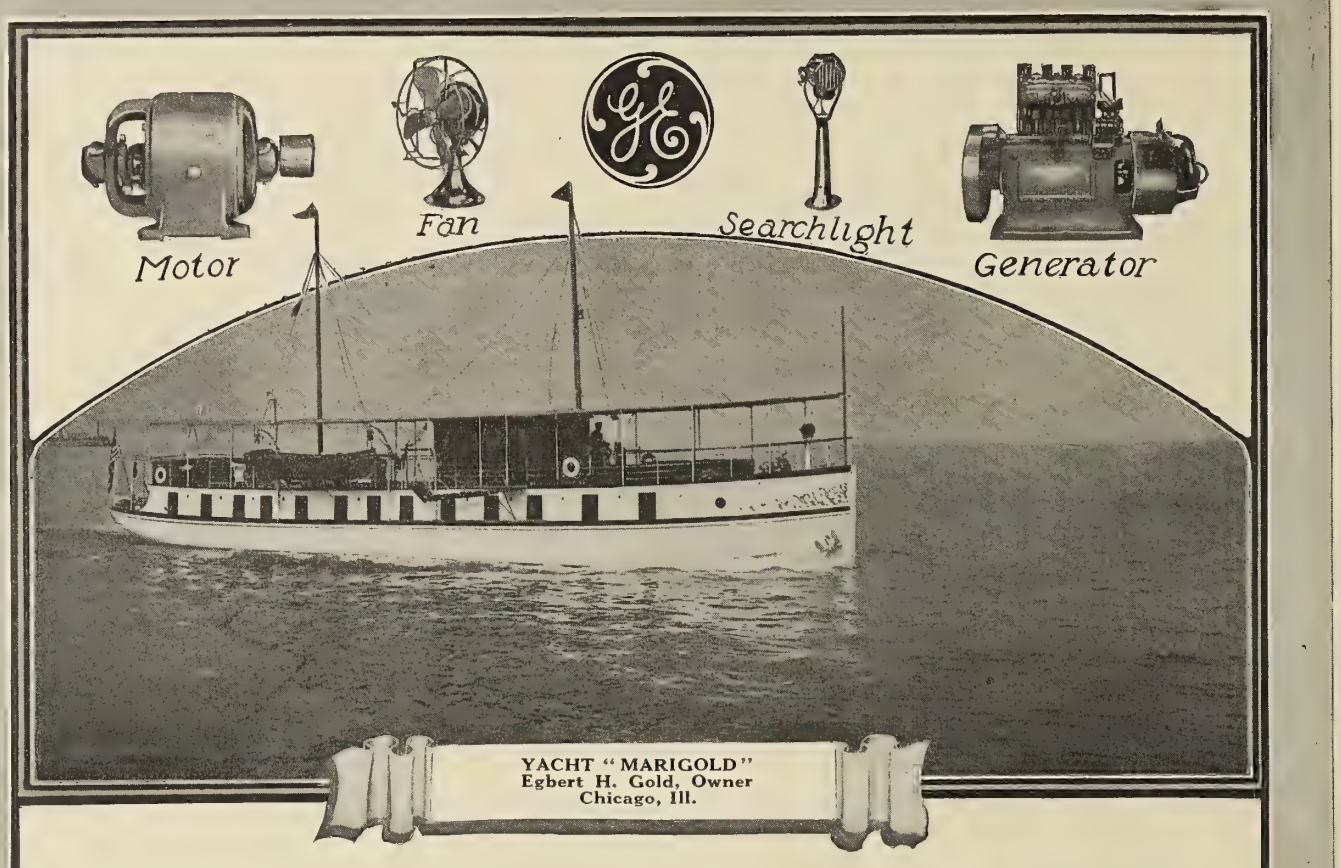

The "Marigold" is equipped with one 5 horse power G-E Gasolene Electric Generator, one CQ motor for pumping service, a G-E 9-in marine searchlight, and G-E fans, lamps, etc.

Electric Service on Board Ship

Brilliant illumination, electric heating and cooking devices, electric signals, searchlights and power devices produce greater comfort and safety on board ship.

Edison Mazda Lamps. in all sizes are especially adapted for lighting any part of the boat.

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Electric Cooking and Heating Devices of all kinds can be operated at a cost incomparable with the convenience and simplicity.

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The Source of Power most economical and convenient for yachts and motor boats is the G-E Gasolene Engine Generator—a thoroughly reliable direct-connected unit which operates successfully with minimum attention. For vessels having steam, the G-E steam engine generator or turbine may be used.

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3949

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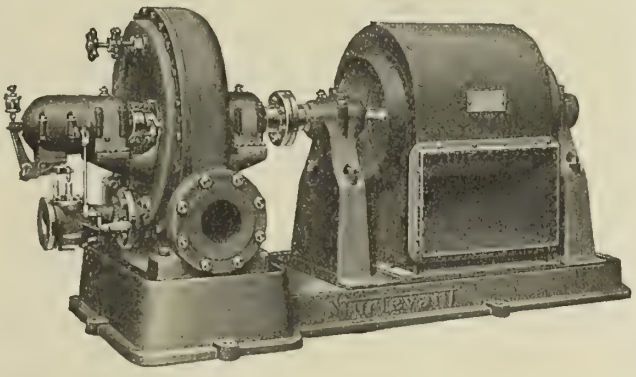
Sturtevant
(REG. U. S. PAT. OFF.)

Turbo-Fan Units for Marine Work



Sturtevant Multivane Fans driven by direct connected Sturtevant Steam Turbines make compact units of small size, large capacities and exceptionally low water consumption.

These sets are specially adapted for forced draft work. The large volume handled by comparatively small units make them invaluable for marine service where space is always restricted.

The principal American built vessels both in the Navy and Merchant Marine are equipped with Sturtevant Fans.

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Hyde Park, Boston, Massachusetts
AND ALL PRINCIPAL CITIES OF THE WORLD

TRADE PUBLICATIONS.

AMERICA

Don't throw away your valves—reseat them. How you may do this is told in Catalogue I-16 published by the Leavitt Machine Company, Orange, Mass. All of our readers interested in the subject should send for a free copy of this catalogue.

"Tobin Bronze" is the title of a 32-page booklet published by the American Brass Company, Ansonia, Conn. "We furnish 'Tobin Bronze' in the following forms: Turned and straight pump piston rods and yacht shafting; rolled plates for rudders, centerboards, pump cylinder linings; condenser tube sheets, fin keels and yacht plates, etc.; flat, round, square and hexagonal bars; bars for forgings, boilers and pump linings, bushings, etc."

J-M Boiler Preservative vs. Boiler Scale is the subject of a booklet published by the H. W. Johns-Manville Company, Madison avenue and Forty-first street, New York. The statement is made that when this boiler preservative is fed into a boiler, it is attracted by the heated steel surface to a much greater degree than is the scale or scale-forming elements. It is said to get underneath the scale next to the boiler, thus causing the scale to become loosened and fall off, so that it may be blown or washed out. The company states that it will send one drum of J-M boiler preservative for sixty days' free trial, and that unless results satisfactory to you are produced no charge will be made for the quantity used in making the test.

"Steel Pressure Blowers" is the title of an illustrated circular, 172-O, published by the B. F. Sturtevant Company, Hyde Park, Boston, Mass. The Sturtevant Company has received the following letter from F. N. Peter & Bro., Newside, Pa.: "In the year '78 we started our foundry and installed a Sturtevant blower, and used it constantly until 1901, when our plant was completely destroyed by fire and, strange to say, up to that time we positively did not spend a cent for repairs, and there was no play in the bearings whatsoever. When we rebuilt the plant in 1902, we again installed the same kind of a blower, and up to the very day and down to this minute we have done nothing to the blower but oiled it. And we are most proud to say that it is in better condition than it was when we received it. Long may the Sturtevant blower live, thrive and prosper."

The "National" spring plug cock is described in a circular published by the National Tube Company, Frick building, Pittsburg, Pa. "The National spring plug cock was designed to overcome the disadvantages of the ordinary style, or through-plug cock. When the plug becomes loose in the ordinary type of cock the workman frequently injures the plug in tightening it. Then, again, should the plug become cemented to the body, it is common practice to loosen the nut and drive up the plug with whatever tools are at hand, no special care being taken to properly adjust the plug afterward. The National spring plug cock has an inverted plug with a spring at the bottom, which constantly presses the plug firmly against the seat. While the plug usually turns easily, should it stick occasionally it may be loosened by a blow on the top, after which it is immediately reseated by the spring. The cap at the bottom is screwed securely into the body, and cannot be tampered with by the workman. These cocks are tested before shipment to 250 pounds cold water pressure and to 125 pounds compressed air pressure under water, and are recommended for 125 pounds working pressure."

The American Ideal steam trap and float valve is described in a catalogue just published by the American Steam Gauge & Valve Manufacturing Company, Boston, Mass. "In introducing the following information to your attention, we desire first of all to have you understand that it is the fixed policy of this company never to market any device that has not first proven to our complete satisfaction and, in varied tests among the largest concerns in the country, its unquestioned superiority over any other device made for the purpose. Consequently, we wish you to feel, and we stand ready at all times to prove, that any new device taken on by us contains features of distinct and superior merit. That is the reason for our securing all rights and contracts to manufacture the American Ideal steam traps and American Ideal float valves formerly owned and made by J. W. Coggshall, under the name of the Tillotson Humidifier Company, of Providence, R. I., and known as the Ideal steam traps and Ideal float valves. We have taken over this line because we have unquestionable evidence that it is the best ever made, in proof of which we submit on another page a partial list of purchasers representative of the very best in our country. That you may understand why we make such conclusive claims about the American Ideal, let us review with you the trap field as our experience has found it."

When writing to advertisers, please mention INTERNATIONAL MARINE ENGINEERING.

"Cincinnati Milling Machines" is the title of a handsomely printed and illustrated 128-page catalogue just issued by the Cincinnati Milling Machine Company, a free copy of which will be sent to any of our readers mentioning this magazine.

A new device for holding in side sheets is described in a catalogue published by H. J. Kroscovski, 128 Ferry street, Milwaukee, Wis. This device consists of a holding-on die, forced against a rivet head in a firebox water leg by powerful leverage, which is operated by hand or by pneumatic or hydraulic power. One of these tools will be sent free on thirty days' trial at the manufacturer's expense.

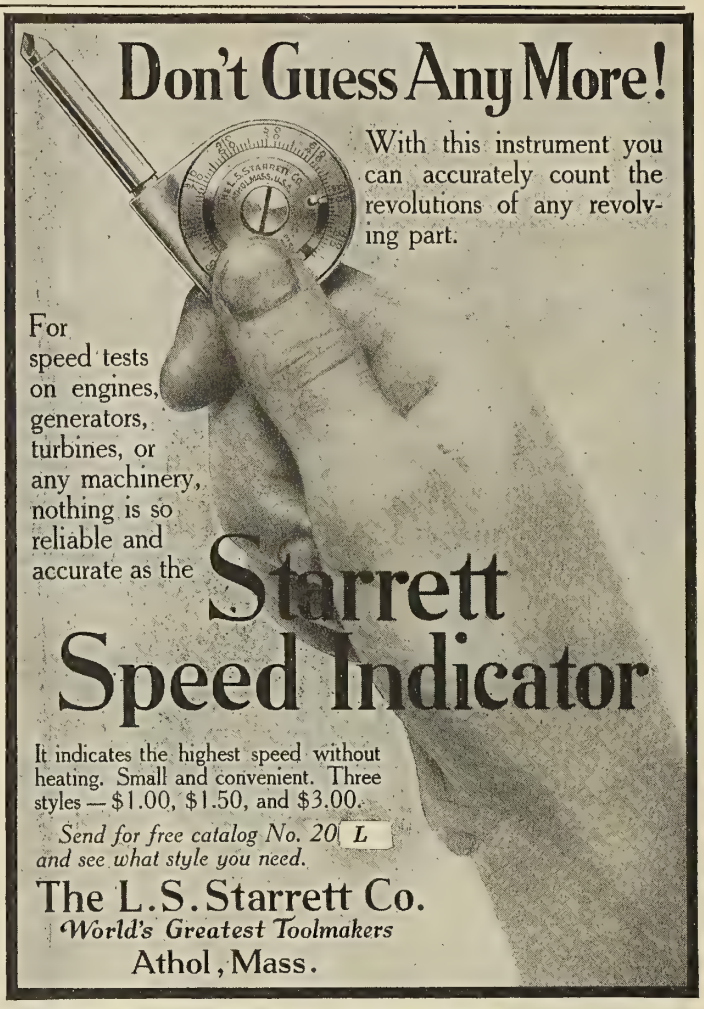
A catalogue of air compressors, air hoists, air cranes, pneumatic and hydro-pneumatic elevators, trolleys, trolley systems and sand blasts has just been published by Curtis & Company Manufacturing Company, St. Louis, Mo. "Engineers of Curtis & Company Manufacturing Company have specialized for twenty years in the field of pneumatic hoisting appliances, and have so developed the simple air cylinder by several patented devices that a new labor-saving power has been given to the industrial world. Curtis air cylinders are virtually straight line motors with wonderful speed control, capable of the widest application to hoisting and conveying problems. They make possible Curtis pneumatic cranes and elevators. Circulars fully describing our appliances furnished on request."

The Hunt Storage Battery Industrial Truck.—The Hunt storage battery industrial truck is built by the C. W. Hunt Company, Inc., West New Brighton, N. Y., and is designed for conveying heavy material around manufacturing plants, steam shop and railroad terminals, etc., where it can be run with the utmost flexibility; can be put on elevators and conveyed to different floors, can be run directly into box cars, which would be well nigh impossible with a system of tracks. These trucks are very compact and have a capacity of approximately 4,000 pounds. With this load the maximum speed is about 5 miles per hour. The storage capacity of the batteries is ample for an ordinary full day's working.

Brownhoist buckets and tubs are described in Catalogue R, just published by the Brown Hoisting Machinery Company, Cleveland, Ohio. "In this catalogue we give descriptions and illustrations of the Brownhoist grab buckets, slag buckets, contractors' grab buckets, shovel buckets, and various kinds of tubs as designed and manufactured by this company. Brownhoist buckets and tubs are being used in practically every part of the world. With this varied line of buckets and tubs we are in a position to solve any bucket or tub problem, no matter what the material may be nor how the bucket is to be handled. We gladly give advice as to what kind of a bucket or tub to use for certain work, and we will submit estimates on receipt of request."

A new flooring composition for ships has been put on the market by Byerly & Sons, 2484 West Fourth street, Cleveland, Ohio. It is described in a catalogue published by that company. This composition is stated to have been used on board the passenger steamer *City of Grand Rapids* and the steamer *Chemung* of the Erie Railroad Lake Line, and to have met every condition vessel owners have been seeking. The composition is an asphalt base, into which stone pulverized to powder and other ingredients are mixed. It is applied boiling hot, and is said to form a perfect bond with either wood, steel or concrete. Being entirely mineral in character, neither heat nor cold, fire nor water have any effect upon it. The greatest merit claimed for, from the ship owners' point of view, is that it cannot be made to crack.

Bars, shapes, plates, sheets, tubes, rivets, boiler shop specialties and boiler shop tools are kept constantly in stock by Joseph T. Ryerson & Son, Chicago, and are described in this company's monthly journal. The following are some of the tools and supplies kept on hand: Bars: Bars, bands, hoops, twisted and cold drawn; shapes: beams, channels, angles, tees, rails, girder sections; plates: universal, tank, flange, firebox steel, floor; sheets: black, galvanized, corrugated, stamping, special; tubes: lapweld, charcoal, seamless, locomotive; rivets and bolts: Burden's iron, boiler tank, structural, tinner's, patch, boiler, carriage, machine, lag screws; boiler shop specialties: Ulster and Ulster special staybolt iron, staybolts, staybolt taps, crabs, crayons, plugs, nozzles, manholes and covers, hangers, lugs, flanges, furnaces, drills, rivet sets; boiler shop tools: Ryerson flue cleaning machines, Otto flue cleaning machines, Ryerson combination hot saw and tube expander, McGrath safe-end machine, Hartz superheater and tube-welding machine, Ryerson pneumatic flue-welding machine, Ryerson flue cutter, Mathews combination tube cutting and cleaning machine, expanders, forges, etc.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With this instrument you can accurately count the revolutions of any revolving part.
For speed tests on engines, generators, turbines, or any machinery, nothing is so reliable and accurate as the
Starrett Speed Indicator
It indicates the highest speed without heating. Small and convenient. Three styles — $1.00, $1.50, and $3.00.
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The L.S. Starrett Co.
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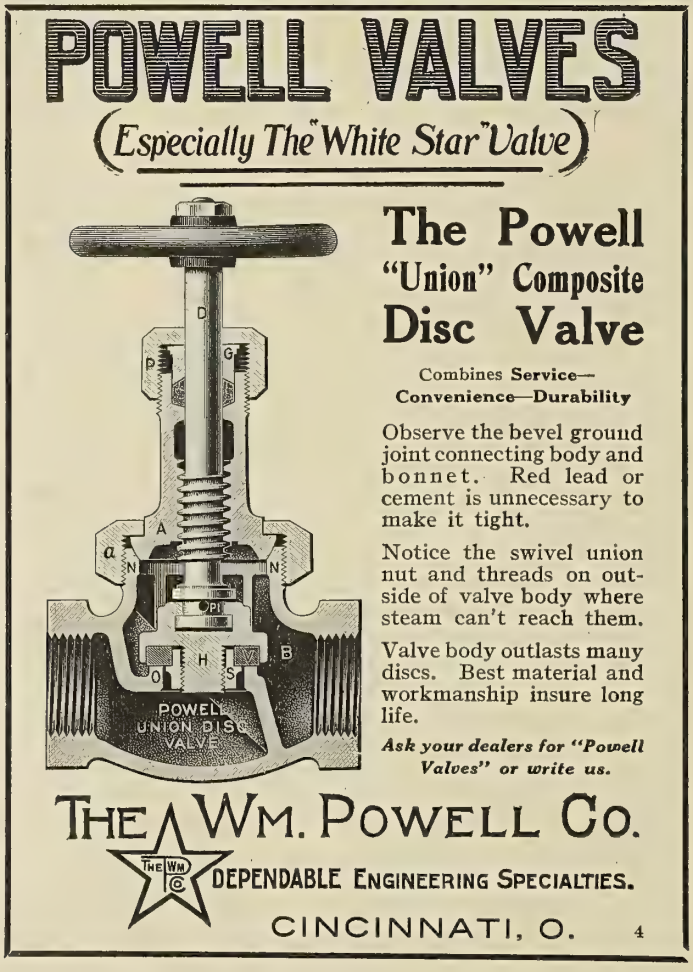
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The Powell "Union" Composite Disc Valve
Combines Service—Convenience—Durability
Observe the bevel ground joint connecting body and bonnet. Red lead or cement is unnecessary to make it tight.
Notice the swivel union nut and threads on outside of valve body where steam can't reach them.
Valve body outlasts many discs. Best material and workmanship insure long life.
Ask your dealers for "Powell Valves" or write us.
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DEPENDABLE ENGINEERING SPECIALTIES.
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It Will Be Better and Much Cheaper to Use

Dixon's

The Pioneer

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Than to Use Some Other
And to Wish It Had Been

Dixon's

Book No. 75 Will Explain Why.

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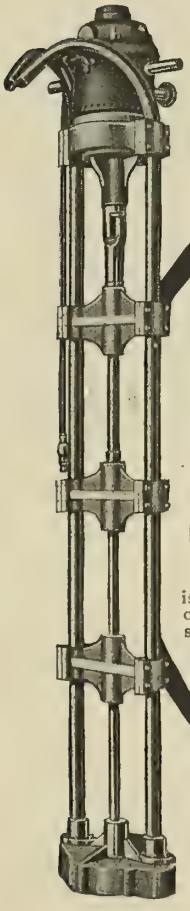
Established 1827

FOR FLYING BOATS USE JEFFERY'S MARINE GLUE

Use our Waterproof Liquid Glue, or No. 7 Black, White or Yellow Soft Quality for waterproofing canvas covering of flying boats. It not only waterproofs and preserves the canvas but attaches it to the wood, and with a coat of paint once a year will last as long as the boat. For use in combination with calico or canvas between veneer in diagonal planking, and for waterproofing muslin for wing surfaces.

Send for samples, circulars, directions for use, etc.

L. W. FERDINAND & CO., 201 South St., Boston, Mass, U. S. A.



A Wonderful Pump

Send a postal and get, in *boiled-down* form, the story of the greatest pump ever designed—the Edwards *"Electro-Portable."* Just the thing for pumping out *boats, barges, etc.*

Simply attach it to any electric light socket, turn the switch and out comes the water "p.d.q." —100 to 500 gallons per minute, according to size.

Works perfectly from *alternating* or *direct* current. Light and easily set up (our 100-gallon size weighs only 118 pounds—motor and all).

No *valves* of any kind. Can't freeze, for it automatically drains itself.

The Edwards "Electro-Portable"

is made of genuine *brass*—ball-bearing—self-lubricating. Motor attaches to exhaust tubing, thus sustaining its own weight.

No bearing on shaft, hence no wear on *parts.* Used by Louisville & Cincinnati Packet Co. and many other prominent concerns.

Sold at exceptionally low price.

Send postal NOW and get our illustrated descriptive Folder and Prices by RETURN MAIL.

The Edwards Manufacturing Co.

324-344 E. 5th St., Cincinnati, Ohio

General Electric marine engine generating sets are described in circulars published by the General Electric Company, Schenectady, N. Y. The statement is made that these generating sets have been giving reliable service on board ship for many years, and that their simplicity of arrangement, small amount of space occupied, and their freedom from evaporation make them especially valuable in marine work.

A New Method of Sales Analysis.—"One concern making use of the Hollerith punched card system writes: 'We figure that it would cost at least four times as much to furnish the same information by hand that we get with the machines, and it would be impossible to get out the work so early in the month.' This concern uses the system for a great variety of analyses, obtaining information used in conducting business from day to day—information which it would be impossible to get together in time by any other known method. Over 300 business concerns in the United States—mercantile, manufacturing, insurance, transportation and others—are now using this up-to-date system for analyzing their daily, weekly and monthly operations. The above quotation from one client is typical. One of the chief advantages of the new method is stated by another client to be 'the ability to obtain statistics and analyses in many different ways from a single original entry—the punched card.' This ability of the machines to handle satisfactorily all sorts of analyses lies in their power to count combined facts. Each counter adds a different set of figures automatically and simultaneously. A new booklet, 'A Business Compass,' has just been published, in which the uses of the system are described in some detail. Copies may be obtained upon request of the Tabulating Machine Company, 25 Broad street, New York."

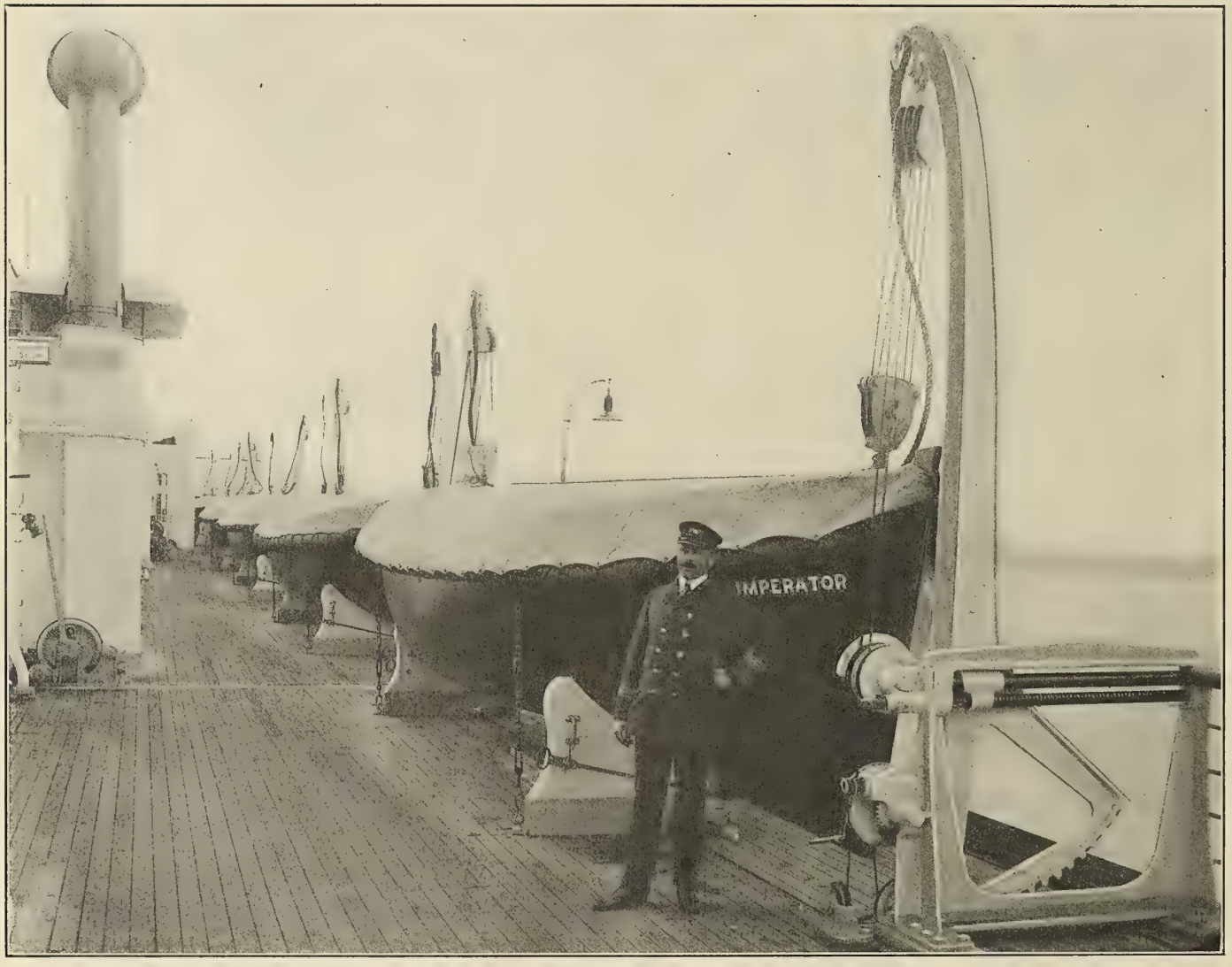
The Troike muffler, made by the Troike Muffler & Manufacturing Company, Lorain, Ohio, is described as follows in a circular the company has just issued: "The Troike muffler is the first real improvement on the internal-explosion engine since the Selden patents were granted. The Troike muffler is so simple in construction, and so positive in performance, that it has been pronounced by builders of motor boats, automobile engineers, builders and designers of marine and stationary engines, as well as gas engine users and experts, to be the one perfect muffler. The Troike muffler is the only muffler that positively ends all back pressure. The Troike muffler is the only muffler that positively will prevent loss of power. The Troike muffler actually siphons the burnt gas from the cylinder, thus increasing power without increasing the consumption of fuel. The Troike muffler breaks up the exhaust wave in such a manner as to end the noise by reducing the exhaust to atmospheric pressure and atmospheric temperature by the time it reaches the outlet. The Troike muffler is so constructed that after each explosion in the cylinders of the engine there is a vacuum created within the muffler. This vacuum siphons the burnt gas from the cylinder, leaving it clear for the next charge, thus increasing the compression and permitting the engine to deliver the same number of revolutions as it did before the muffler was applied. In fact, these revolutions are delivered with more power and greater regularity, with a lesser consumption of fuel."

The "Airex," an automatic feed-water air extractor, is described in a catalogue just published by the General Condenser Company, 1239 North Twelfth street, Philadelphia, Pa. "Expensive and dangerous break-downs of boiler plants, due to air entering the boilers, either with the feed water or through leakages in the pipes and feed pumps, have necessitated the construction of apparatus for eliminating the air from the feed water before entering the boiler. Water at 60 degrees F. contains 1½ to 2 percent of air in volume, and this air the apparatus eliminates. The following are its chief advantages: 1. Complete elimination of air from the feed water, and consequently: 2, rusting and corrosion of the boiler; 3, corrosion of the valves and other brass fittings, and 4, shocks in pipe lines are avoided. 5. As the air from the feed water has been eliminated, the quantity of air entering the condenser is reduced, and therefore the capacity of the air pumps can be reduced by that amount. Apparatus formerly known for this purpose were generally constructed so that the air, eliminated from the water, escaped through a valve at the highest point of the air vessel, opened automatically by a float. This principle has been applied to a good many apparatus, but has the disadvantage that the apparatus only works satisfactorily as long as the discharge valve at the top of the air chamber holds tight. As soon as this valve for any reason leaks, and the volume of air from the water is not at least equal to the volume of air leaking through the valve, the water will rise in the air vessel till the same is quite full, and the surface of water, which must essentially be exposed for eliminating the air, is no longer exposed."

WELIN MARINE EQUIPMENT COMPANY

305 VERNON AVENUE, LONG ISLAND CITY, N. Y.

Safety at sea was the *first* consideration in fitting out the *Imperator*, therefore our quadrant davits were selected.



UPPER DECK SHOWING OUR QUADRANT DAVITS AND HANDLING CONTROL

Standard Metallic & Wooden Lifeboats *A.B.C. Life Preservers*

Lundin Decked Lifeboats *Life Rafts* *Welin Quadrant Davits*

ALL THE BEST

LONDON HOUSE:

The Welin Davit & Engineering Company, 5 Lloyds Avenue

Bulletin "W H Y-12," published by the Alberger Pump & Condenser Company, 140 Cedar street, New York, explains why the company claims that Alberger turbine boiler-feed pumps ought to be on board all ships.

The Lalor automatic stop valve for fuel oil users is described in a catalogue published by the Lalor Fuel Oil System Company, 1326 Chestnut street, Philadelphia, Pa. This valve is described as being one that makes the use of fuel oil as safe as coal—"a perpetual fire, life and accident insurance."

Industrial ozonators are described in Bulletin No. 850, published by the Sprague Electric Works, 527 West Thirty-fourth street, New York. The field for the application of ozone may be divided into three general classes: For ventilation and air purification; for use in manufacturing processes; for water purification. "For the practical application of ozone to any of the foregoing uses, the Sprague Electric Works manufacture the industrial ozonator. The essential parts of this equipment are: an ozone generator, a transformer, an air filter and a controlling panel."

A catalogue of inclined elevators for handling freight at steamship docks is published by the Otis Elevator Company, Eleventh avenue and Twenty-sixth street, New York. The Otis Elevator Company reports that within one month it has been called upon to furnish inclined elevators as follows: For the New York Central Lines, New York, 4; Carolina Terminal Company, Charleston, S. C., 4; Old Dominion Steamship Company, Norfolk, Va., 2; Mystic Dock, Boston, Mass., 2; Merchants & Miners' Dock, Savannah, Ga., 2.

"Machine Tool and Machinery Bronzes" is the title of a booklet just issued by the Lumen Bearing Company, Buffalo, N. Y. "Lumen is a strong, hard, white bearing bronze, effective under heavy loads and at high speeds. When fitted in the manner that best practice in the uses of this metal has established, it is one of the most effective bearing materials known. Lumen records show the following applications: Engine lathes, main spindle bearings; multiple spindle automatic screw machines, all bearings; boring mills, vertical slide shoes, pulley bushings; planers, oil rollers, pulley bushings; milling machines, spindle bearings, lead screw nuts, telescopic screws, countershaft and pulley bushings; refrigerating machinery, bearing bushings; traveling cranes, all bearings; rolling mills, plate mill tables; rock drills, piston rings."

Smooth-On Iron Cement No. 7 is described in a catalogue just published by the Smooth-On Manufacturing Company, Jersey City, N. J. This concrete is made for surfacing and stopping leaks in concrete, and is said to have met with great success when used for this purpose.

"Asbestosteel for Roofs and Walls" is the title of a handsomely printed and illustrated catalogue of 54 pages, published by the Asebestos Protected Metal Company, Beaver Falls, Pa. The catalogue states that this company some years ago solved the problem of protecting sheet steel from corrosion without in any way sacrificing the advantages inherent in corrugated sheets for roof and wall construction, by developing a process whereby sheet steel was covered on both sides with a uniform covering of asphalt, this in turn being protected from fire and weather exposure by a layer of pure asbestos felt laid over the asphalt while still hot and soft.

"Lunkenheimer Regrinding Valves" is the title of a handsomely printed booklet, illustrated in colors, just published by The Lunkenheimer Company, Cincinnati, Ohio. "The large sale of Lunkenheimer regrinding valves has demonstrated that steam users appreciate the fact that it is possible to secure in them a reliable valve, which can be repaired without disconnecting pipes, or incurring any expense other than the slight labor involved in regrinding the seating surfaces. When a steam user installs Lunkenheimer valves the expense ends with the purchase of the articles. This is not true with valves in which to secure a new seat bearing it is necessary to purchase extra parts; therefore, as a matter of economy the first cost of Lunkenheimer valves should not be the principal consideration."

"Producer Gas for Power Fuel" is the title of a catalogue published by the Syracuse Industrial Gas Company, Syracuse, N. Y. "The producer plant eliminates danger of explosion, fire and the nuisance of boiler inspection and insurance. The smoke nuisance problem is solved and the expense of chimney saved. The labor of handling coal and ash is only about one-sixth that for a steam plant of equal size. The space required for a producer plant is about half that for a steam plant. Moreover, a high-class engineer is not needed. A careless or incompetent operator does not have the opportunity to waste fuel, and the worst thing that can happen is a stoppage of power for the want of gas. The time necessary for starting up is less than for a steam plant, fifteen or twenty minutes in most plants. The gas power plant shows itself to be an investment rather than an expense, and many installations displace steam plants in excellent condition."

COBBS HIGH PRESSURE SPIRAL PISTON AND VALVE STEM PACKING

It has stood the test of years and not found wanting

It is the most economical and greatest labor saver

WHY? Because it is the only one constructed on correct principles. The rubber core is made of a special oil and heat-resisting compound covered with duck, the outer covering being fine asbestos. It will not score the rod or blow out under the highest pressure.

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CHICAGO, ILL., 130 West Lake Street
ST. LOUIS, MO., 218-220 Chestnut Street
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SAN FRANCISCO, CAL., 129-131 First St., Oakland
BOSTON, MASS., 232 Summer Street
PITTSBURGH, PA., 420 First Avenue
PORTLAND, ORE., 40 First Street
SPOKANE, WASH., 157 S. Monroe Street

Lunkenheimer iron body valves are among the hundreds of valves of all kinds described and illustrated in a large catalogue published by The Lunkenheimer Company, Cincinnati, Ohio. A copy will be sent to any of our readers upon request.

"H & M" index and recording thermometers are described in illustrated catalogues published by the H & M division of the Taylor Instrument Company, Rochester, N. Y. That they are correct in construction and design is stated to be proved by the fact that of all thermometers of all makes combined used in the United States navy, more than half are made by the Taylor Instrument Company.

Close-quarter piston air drills are described in illustrated Catalogue No. 9, published by the Independent Pneumatic Tool Company, Chicago, Ill. "The neat and compact construction of these drills, together with the design of the mechanical parts, has resulted in their becoming the most successful pneumatic tools ever placed on the market. We will send one of them on trial free to any responsible party."

Fire extinguishing on shipboard is the subject of a pamphlet just published by the Fumigating & Fire Extinguishing Company of America, 29 Broadway, New York. This company has equipped a large number of steamships with its fumigating and fire extinguishing machines. Among many new ones recently equipped are the *Minnesotan, Dakotan, Montanan, Pennsylvanian, Panaman, Washingtonian, Iowan* and *Ohioan.* This machine has been approved by the Department of Commerce and Labor, and ships so equipped do not require other fire extinguishing equipment.

Metallic packings are described in a catalogue just published by the Holmes Metallic Packing Company, Wilkes-Barre, Pa. "A few reasons why the Holmes Patent Improved Metallic Piston Rod and Valve Stem Packing is the best: 1. Made in the very best manner that good workmanship can produce. 2. Made of the best material for purposes of wearing and anti-friction qualities. 3. Less friction on the rod and stem than any other packing made. 4. Will not wear the rod out of round or uneven, score or scratch the rod. 5. Saves oil, for we do not require the rod to be deluged with oil. 6. When once packed good for three years. 7. Saves the eternal and everlasting buying of steam packing. Equally good for steam pumps, and for air compressors cannot be excelled. We have said enough; try it for yourselves. We ask no one to pay for it until they have tried it."

Speed indicators for speed tests of engines, generators, turbines, or any machinery, are described in Catalogue 20-L, published by the L. S. Starrett Company, Athol, Mass.

The Christmas edition of the Eckliff Booklet will be sent to any of our readers upon request by the Eckliff Automatic Boiler Circulator Company, 46 Shelby street, Detroit, Mich. "Raising 160 pounds steam in 45 minutes from cold water is the record of a recent Eckliff installation, and there are many other Eckliffs furnishing like testimony."

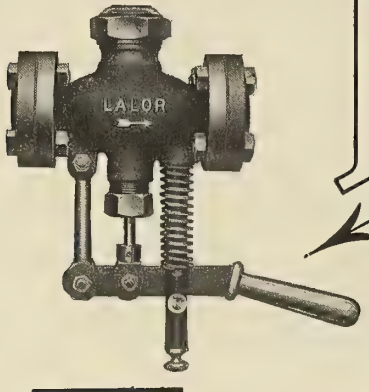
Catalogue I. M. has just been issued by the Kerr Turbine Company, Wellsville, N. Y. In this catalogue the statement is made that "Economy" turbines, manufactured by the Kerr Turbine Company, are made to furnish the current for lighting and power on the World's largest fresh water boats, such as the *Seeandbee,* the *City of Detroit III,* and many others.

Filling ice boxes costs a lot of money and wastes valuable time. The Brunswick Refrigerating Company, 130 Jersey avenue, New Brunswick, N. J., explains in a catalogue just published how the refrigerating plant eliminates these losses and enables you to cool your ship's stores, make any quantity of ice and to have cool drinking water.

Lackawanna steel sheet piling is described in an illustrated catalogue published by the Lackawanna Steel Company, Lackawanna, N. Y. According to the catalogue, "Universal recognition of Lackawanna steel sheet piling as a leader is based upon its supremacy in lateral and transverse strength, flexibility of interlock, easy driving qualities and water tightness, as competitive and other tests have demonstrated."

Kewanee Unions are the subject of a catalogue just published by the National Tube Company, Frick building, Pittsburg, Pa. This union has no inserted parts, and it is stated that as a result of long experience the manufacturer is enabled to state positively that although the cost is a little higher at first, the ultimate cost is considerably lower.

Roberts safety watertube boilers are described in a catalogue published by the Roberts Safety Water Tube Boiler Company, 112 Chestnut street, Red Bank, N. J. The statement is made in the catalogue that these boilers are the only ones designed with a view to scientifically arranged heating surfaces, which make it possible to show high efficiency and economy with a low ratio of heating surface to grate surface, and stack temperatures less than the temperature of the steam.



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FOR

FUEL OIL SYSTEMS

The Valve that makes the use of Fuel Oil as safe as coal. A perpetual Fire, Life and Accident Insurance

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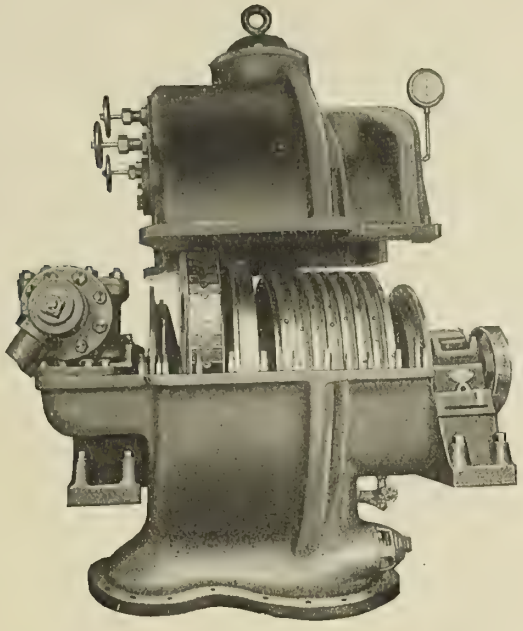

Absolute Dependability

That's what's needed afloat—miles from a machine shop—miles from another source of light or power—miles from a satisfactory remedy if once your electric plant breaks down. And the same is true of your pumping and forced draft sets.

TERRY TURBINES

furnish this extreme reliability. They don't break down—they don't give "the old man" a case of "nerves"—they don't take half the time of every watch to keep them in shape.

Inspection of all internal parts can be made by lifting off the upper half of the casing, without disturbing steam or exhaust connections. One man came into the shop the other day to "see what the inside of a Terry looked like." He'd had one for more than two years, but had never had occasion to open it up. That's the kind of service that's needed on shipboard, and that's what Terry Turbines always give you.

Marine Bulletin on Request

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Main Office and Works:
HARTFORD, CONN.

British Agents: - YARROW & CO., Ltd.
Scotstown, Glasgow

Agencies in all Principal Cities. 32-210

A new fire hose catalogue has just been issued by the Eureka Fire Hose Manufacturing Company, New York. The catalogue states that this company's fire hose is circular woven and uniform, not flat woven like other makes.

Sangamo meters are described in Bulletin No. 36, published by the Sangamo Electric Company, Springfield, Ill. "A very interesting application of Sangamo ampere-hour meters is on the new submarine boats of the United States navy. These boats are operated by gasolene engines when running on the surface, at which time storage batteries are being charged, but when submerged the boat cannot, of course, be propelled by any combustion engine, and is then driven by electric motors drawing energy from the batteries. Sangamore meters are used to measure the total input and output of these large batteries, and separate meters are used to record the electricity taken by the auxiliaries, such as lamps, fans, etc. The introduction of Sangamo meters on the submarines has greatly simplified the problem of keeping the batteries fully charged and in proper operating condition."

TRADE PUBLICATIONS

GREAT BRITAIN

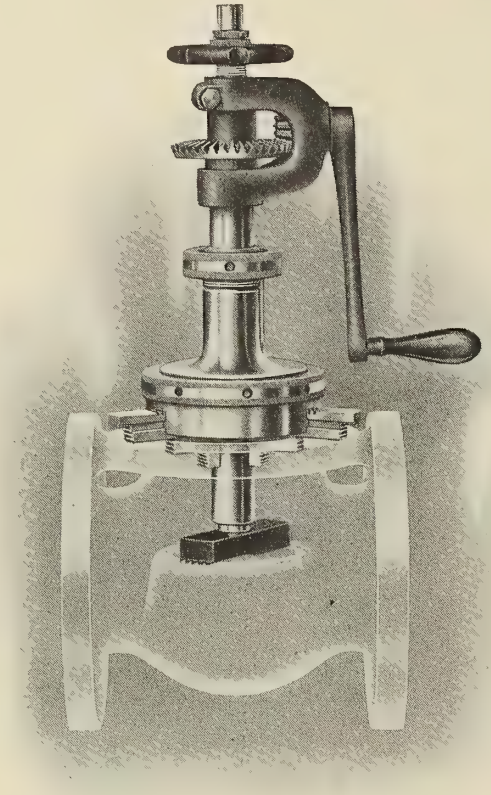
Atlas cleaner and disinfectant, which is stated to be especially valuable for use on board ship, is described in a catalogue published by the Atlas Preservative Company of America, 95 Liberty street, New York, and Windmill Lane Wharf, Deptford, London, S. E. This is described as a highly concentrated and refined compound, which is to be diluted with water according to the work intended, and used for preserving, cleaning and disinfecting wood work.

Electric hand drilling, tapping and reaming machines are described by the Power Plant Company, Ltd., West Drayton, Middlesex, England, in a catalogue just issued. "Universal electric driling machines, Type N½. This machine contains a 6-horsepower motor, and drills holes up to 1¼ inches in wrought iron. The machine rotates round the vertical column as well as round a horizontal axis, so that holes in any direction can be drilled. In consequence of this freedom of movement—feed in any desired direction—this machine is extremely handy on erection work of boilers, constructional iron work, etc. The drilling spindle has a feed of 4⅜ inches. The machine can be supplied without base and column, also on wheels, or with longer column."

Light draft steamers, launches, turbines, engines and boilers are described in a catalogue issued by Alley & MacLellan, Ltd., Sentinel Walks, Polmadie, Glasgow, "The requirements of our clients are so varied, and the conditions relating to draft, speed, cargo and passenger accommodation that they wish fulfilled so widely different, that it would be almost impossible to get a catalogue to meet everyone's wants. Bearing this in mind, we have aimed by illustrating a few of the leading types selected from the boats (about 300) which we have built during the last fifteen years to make this more a book of reference from which our clients may describe the type or modification of type they wish particulars of. We are always glad to give any information to intending purchasers, and to submit drawings, specifications and full particulars of a boat which our experience teaches us will best meet the conditions given in their inquiry. In conclusion, we may say that it would, in many cases, save much correspondence if clients gave very much fuller particulars of their requirements and the conditions under which the boat they require will have to work."

Compasses, sounding machines and nautical specialties are described in a handsomely illustrated and printed catalogue of 100 pages, just published by Dobbie-McInnes, Ltd., 57 Bothwell street, Glasgow. "Most modern standard compasses are practically developments of the original Sir William Thomson compass, which introduced a light card with short needles and a form of suspension then suited to counteract the effect of vibration on the compass card. Subsequent improvements in standard compasses have been on similar lines to keep pace with the greater disturbance or vibration introduced by more modern vessels of higher power and speed. Of existing well-known compasses of this type there are several examples, such as the Dobbie-McInnes and Kelvin form. In the Dobbie-McInnes standard compass the best features of the original Sir William Thomson compass have been retained and are supported by patent improvements in duplex suspension, style of card, lighting and compensating facilities as afterwards described. This compass is unsurpassed by any other compass in point of design and accuracy of workmanship, and has been adopted as standard by many of the largest shipowners."

When writing to advertisers, please mention INTERNATIONAL MARINE ENGINEERING.



Reseat your Valves
Don't throw them away

We'll send a Dexter Valve Reseating Machine on thirty days' trial to parties with satisfactory rating, so you can prove to your own satisfaction that it will soon more than save its cost. Any ordinary mechanic can reseat any valve with one of these machines without disconnecting the valve from the steam pipe.

Send for Catalog I-16

The LEAVITT MACHINE CO.
ORANGE, MASS.

Brayshaw specialties, such as furnaces, pyrometers, milling cutters, gas producers, blowers, temperature measuring instruments, etc., are described in a catalogue just published by S. N. Brayshaw, 2 and 4 Mulberry street, Hulme, Manchester.

Dermatine valves are the subject of an illustrated catalogue issued by Dermatine Company, Ltd., 93 Neate street, London, S. E. "In many cases engineers have discontinued the use of rubber valves owing to inferior or unsuitable qualities indiscriminately supplied, and have been driven to adopt metallic or other substitutes. The fact of the matter is that the leading rubber manufacturers have not given the attention to the making of valves that it undoubtedly deserves. Without perhaps an exception, they make in this and other countries varying qualities at different prices, leaving it to chance which are sold and used. One quality of Dermatine only is made, and that the best, varying only in toughness and hardness according to the conditions under which the valve has to work, such as lifts, pressures, temperatures, etc. All valves are stamped 'Dermatine,' so that engineers, whether they are at home or abroad, are sure of getting the best possible article if they stipulate for Dermatine when buying or indenting; and this system, particularly during the last five or six years, has tremendously increased the demand for Dermatine valves. Large engineers in this country, the Continent and the Colonies, having had practical experience of their value, are constantly recommending Dermatine valves. Dermatine air pump valves, whether for curved or flat guards, have been used and are recommended by the Edwards Air Pump Syndicate, a fact which proves the particular suitability of Dermatine for this class of work. The Dermatine Company has frequently found that engineers do not use the best form of lift, guard and grating, so it was thought advisable to get an expert in condenser pumps to give the most approved. sections. The experience of the Dermatine Company enables it often to give useful information on matters concerning the life of the valve and the most suitable way of working. Engineers are specially invited to ask any questions on the subject, and an endeavor will always be made by the company to give any information in its power."

BUSINESS NOTES

AMERICA

THE BADENHAUSEN WATER TUBE BOILER COMPANY, of New Jersey, has been incorporated. This company manufactures marine and stationary boilers. The main office is at 39 Cortlandt street, New York.

"PALMETTO" PACKING, made by Greene, Tweed & Company, 109 Duane street, New York, is being used on Great Britain's latest super-dreadnought, the *Thunderer.* Free working samples of this packing will be sent to any engineer upon request.

AMONG RECENT CONTRACTS closed for Terry turbines for Government work, one covers two 50-kilowatt sets for the United States fuel ship *Kanawha,* building at the Mare Island navy yard, San Francisco. Another includes two 300-horsepower turbines for fire pumps for the Brooklyn navy yard, each running at 2,600 revolutions per minute.

MR. HAROLD D. TOMPKINS, a graduate of Cornell University and formerly associated with the Niles-Bement-Pond Company, of Philadelphia, has accepted the position of mechanical engineer with the Smooth-On Manufacturing Company, of Jersey City, N. J. He has charge of their concrete waterproofing department.

A RECENT ADDITION to the staff of the centrifugal pump department of the A. S. Cameron Steam Pump Works, New York, is Mr. C. V. Kerr, the organizer of the Kerr Turbine Company, and later with McEwen Bros., of Wellsville, N. Y. Mr. Kerr delivered an interesting address with stereopticon views on "A New Centrifugal Pump with Helical Impeller" at the monthly meeting, 11th inst., American Society of Mechanical Engineers, at their rooms, New York City. Reference to this subject in extended form appeared in the October number of the Journal of the society.

THE AMERICAN BLOWER COMPANY, Detroit, Mich., has purchased the entire air washer interests, including patent rights, of the McCreery Engineering Company, formerly of Toledo, Ohio, and later of Detroit, Mich. The McCreery company enjoy a universal reputation as engineers and manufacturers of efficient air purifying apparatus. Their earlier efforts were almost exclusively confined to marine work, and later entering the general ventilating field, in which the air purifier now forms an indispensable part of any mechanical ventilating system. The McCreery purifying, cooling and humidifying equipment will hereafter be exclusively manufactured and sold by the American Blower Company, under the trade-mark *"Sirocco."*

THE GARDNER GOVERNOR COMPANY, Quincy, Ill., announces that it has opened a New York office in the Singer building, 149 Broadway.

THE ROSS SCHOFIELD COMPANY, manufacturer of boiler circulators, has moved its office from 39 Cortlandt street to 17 Battery Place, New York.

WE ARE INFORMED by the Carlisle & Finch Company, 234 East Clifton avenue, Cincinnati, Ohio, that most of the boats described in the November issue of INTERNATIONAL MARINE ENGINEERING are equipped with Carlisle & Finch searchlights; that in particular all of those illustrated in Captain Burnside's article are equipped with these searchlights, also the fifteen producer-gas barges for the Alabama & New Orleans Transportation Company, as well as all of the vessels of the Port of Para, Para, Brazil.

IN ORDER TO PROPERLY TAKE CARE of the big increase in its volume of business, the Baltimore branch of the H. W. Johns-Manville Company, has been compelled to seek larger quarters. The new home of the company is a modern six-story building with floors measuring 47 by 187 feet, located at 207-13 East Saratoga street, which is within two blocks of the postoffice and right in the heart of the business section. It will include an attractive store and up-to-date offices, in addition to large warehouse accommodations. To facilitate the handling of incoming and outgoing shipments there will be a railroad switch running into the building.

THE KEYSTONE LUBRICATING COMPANY, Philadelphia, Pa., announces that the word "Keystone," as applied to greases and lubricating oils, belongs to Augustus C. Buzby, doing business as the *Keystone Lubricating Company*, because of his introduction of his product under that name in 1885. This is the decision of the United States District Court for the Northern District of Illinois. The suit in which the validity of this trade-mark was established was fought between the Keystone Lubricating Company, of Philadelphia, Pa., and a Chicago concern. The court thereupon decided that "the complainant having a valid trade-mark, the defendant had no right to use the word 'Keystone' in its corporate name, so far as the sale of lubricating grease by it is concerned, if the public is thereby misled," and ordered that the Chicago concern should incorporate its lubricating grease business under some other name, or adopt some other plan to avoid infringement.

MR. PHILLIP P. BOURNE has recently been appointed chief engineer of the Epping-Carpenter Pump Company, with shops at Pittsburg. Mr. Bourne was for eight years chief of the engineering staff at the Blake-Knowles Steam Pump Works, East Cambridge, Mass. This appointment is in line with other recent activities of the Epping-Carpenter Pump Company in strengthening their organizaton and enlarging their plant to handle their rapidly-increasing business, especially in high duty and centrifugal pumping machinery.

A NEWS ITEM FROM BANTAM.—The Bantam Anti-Friction Company, Bantam, Conn., has moved its Detroit office to room No. 525 Dime Savings Bank building, with telephone connections, so as to be in close touch with all friends and customers in Detroit. Mr. John W. Hill, mechanical and sales engineer, is much pleased with his new quarters, and cordially invites all of the friends of the Bantam Anti-Friction Company, when passing through Detroit, to stop and visit with him. Mr. Hill's territory has also been extended to cover everything west of Cleveland, Ohio. This new move during the present uncertainty and slack times in the automobile and allied industries on the part of the Anti-Friction Company speaks well for the optimism and faith of the management of the company in a revival of the present condition. With apologies to a good old poet, we might say: "Ball-bearing companies come and ball-bearing companies go, but W. S. Rogers and the Anti-Friction Company go on forever."

THE EDWARDS MANUFACTURING COMPANY, 324 East Fifth street, Cincinnati, Ohio, sends us the following description of its "electro-portable" pump: "The principal market for this pump has been among owners of boats, barges, etc., who have found it a decided success. The pump is simply attached to an electric light socket, after which a turn of the switch starts the water coming at a rapid rate—sometimes 500 gallons per minute. Another feature is that it works perfectly whether on an alternating or direct current. It is an unusually light pump and easy to set up. The motor and all on this small-size pump weighs only 118 pounds. The absence of valves is another notable feature. The pump can't freeze, as it automatically drains itself. The material is genuine brass, and it is of ball-bearing construction—self-lubricated. The motor sustains its own weight, being attached to the exhaust tubing. The fact that there is no bearing on the shaft means no wear on the parts. Among the prominent concerns which recently have purchased these pumps is the Louisville & Cincinnati Packet Company."

BULKHEADS
PANELED WITH
NEVASPLIT
ARE

Water Resistant——Light Weight——Hard——Rigid
Have Plenty of Tensile Strength

Non-Inflammable Nevasplit Bulkheads and Deck Panels

Are an Effective Barrier Against Fire

UNITILE for Ships' Bathrooms, Cannot Crack or Shake Loose.
Weighs less than one pound per square foot applied.

SEND FOR SAMPLES.

KEYES PRODUCTS CO., 71 W. 23rd St., NEW YORK

ROPE KNOWLEDGE.—The terms used by the makers of rope and also by those who sell this commodity are not always understood, especially in the case of those who have had little or no experience in handling rope. In a recent number of *Plymouth Products* we find these technical terms explained as follows: Yarn or thread: A number of fibers twisted together compactly. The twist can be either right or left-hand, as the goods require. Strand: Two or more yarns twisted together in the opposite direction to the twist in the yarns. Common-laid rope: Three or more strands twisted together in the opposite direction to the twist in the strands. Hawser-laid or cable-laid rope: Three—sometimes four—common-laid, three-stamped ropes twisted together in the opposite direction to the twist in the hopes. Lay: The degree of twist in a common-laid or hawser-laid rope, as shown by the number of turns per foot. Lays commonly used by us are regular, medium soft, soft, extra soft, medium hard, hard and extra hard. Often expressed as hard-laid, soft-laid, etc. Right-laid rope: Rope in which the strands are twisted together clockwise; *i. e.*, in the same direction as the movement of a clock's hands. Left-laid rope: Rope in which the strands are twisted together anti-clockwise. A hawser-laid rope is almost always constructed of right-laid ropes, making the hawser-laid rope itself left-laid. Hawser: A large common-laid rope used for towing. This should not be confused with hawser-laid rope described above. Coil: Standard length, unless descriptions designate otherwise, 200 fathoms or 1,200 feet. Half-coil: Standard length, unless descriptions designate otherwise, 100 fathoms or 600 feet. Yardage: Length per pound.

RECENT INSTALLATIONS by the Brunswick Refrigerating Company, New Brunswick, N. J., which builds refrigerating and ice-making plants for steamships as well as for land installations, include the following: A 4-ton plant on the steamship *Berkshire* of the Hudson Navigation Company, used for refrigerating work; a 2-ton plant for refrigerating work on the steamship *Buenaventura* of the Isthmian Steamship Company, of New York City. The Government Coast Survey steamer *Bache* was recently equipped with a 1-ton Brunswick refrigerating plant. Shortly after this the Isthmian Steamship Company placed a second orde rwith them for equipping their steamship *Santa Rosalia* with a 2-ton plant. Later an order was received from an exporting firm in New York City for a small ice-making apparatus for the *Empressa de Vapores F. Perez Rosa*, a river steamer hailing from Puerto Colombia, Republic of Colombia. A repeat order, by the way. A. H. Bull & Company have placed an order recently with the Brunspany placed a second order with them for equipping their steamer of their line to be equipped with a Brunswick plant. Repeat orders such as this prove the value of the Brunswick plant to steam ship owners. Through the Fore River Shipbuilding Company, of Quincy, Mass., the steamers *Atlantic* and *Pacific*, of the Emery Steamship Company of Boston, have each been equipped with a 1-ton Brunswick refrigerating plant. The New York & Cuba Mail Steamship Company placed an order with the Brunswick Company for equipping the steamship *Antilla*, the first of their freight steamers to be equipped with refrigerating plants, with a 2-ton plant for refrigerating and ice-making work. The plant was installed in part on one trip, and leaving the refrigerators undisturbed the installation was completed upon the return of the steamer to New York, after its trip South. The Texas Company ordered a 2-ton plant for their steamship *Texas*, the first of their steamers to be equipped with a refrigerating plant, and this was installed while the steamer was undergoing repairs in New York. The Brunswick Company is able to furnish and install this marine apparatus in a very few days and at only a day's notice. They will be glad to send you a list of steamships equipped with their plants on request. Just drop a line requesting this list to the Brunswick Refrigerating Company, 130 Jersey avenue, New Brunswick, N. J.

BUSINESS NOTES

GREAT BRITAIN

CASTOLIN AUTO-CHEMICAL WELDING.—We are informed by The Casolin Company, of Great Britain, Clock House, Arundel street, Strand, W. C., that, at the commencement of those two great enterprises, the Berne-Loetschberg-Simplon and the Mont D'Or tunnels a standard case of the "Castolin' auto-chemical welding process was installed at each end, and during the whole of the boring was used for the purpose of repairing all broken machinery—in cast iron iron, wrought iron and steel.

QUINCY A. SHAW, Prest A. J. GARCEAU, Treas
A. H. FOLGER, Mgr. R. C. MONTEAGLE, Ass't Mgr. & Engineer

THE LOCKWOOD MANUFACTURING CO.
Established 1880
IRON WORKS EAST BOSTON, MASS.

The R. C. Monteagle Patent Piston and Piston Valve Packing

for Reciprocating Engines of *any make*—Marine, Stationary, Steam, Gas, Water, or Ammonia, Vertical or Horizontal
Will Reduce Fuel Bill to a Minimum

Bottle Tight
Practically No Friction
Practically No Wear

LESS FUEL INCREASED LESS LABOR EFFICIENCY

Diesel Engine Information

The Publisher of International Marine Engineering has made arrangements with the well-known London Diesel engine expert, Mr. J. Rendell Wilson, to give *free* advice to bona fide Ship-owners in connection with the installation of heavy oil engines.

Mr. Wilson, who is a frequent contributor to this journal will be pleased to advise as to what type and make of engine is suitable for any particular vessel, provided dimensions of the vessel, power and speed required, also dimensions of the engine-room, and a drawing of the accommodation arrangements are enclosed.

Advice will also be given regarding proposed conversions from steam, or gasoline, to heavy oil power. In such cases the present running costs should be added, and then Mr. Wilson will point out the saving that can be effected.

Correspondence should be addressed to MR. WILSON, care of International Marine Engineering, either at the New York or London Office.

When writing to advertisers, please mention INTERNATIONAL MARINE ENGINEERING.

HELP AND SITUATION AND FOR SALE ADVERTISEMENTS

No advertisements accepted unless cash accompanies the order.

Advertisements will be inserted under this heading at the rate of 4 cents (2 pence) per word for the first insertion. For each subsequent consecutive insertion the charge will be 1 cent (½ penny) per word. But no advertisement will be inserted for less than 75 cents (3 shillings). Replies can be sent to our care if desired, and they will be forwarded without additional charge.

Ship Draughtsman Wanted—First-class detailed draughtsman. Must be quick and accurate. Apply *Box No.* 81, care INTERNATIONAL MARINE ENGINEERING.

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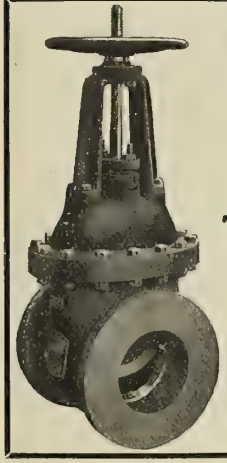

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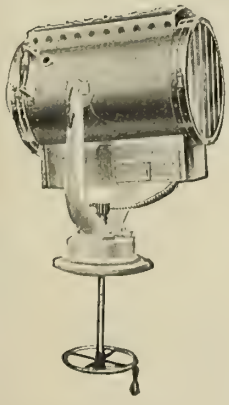

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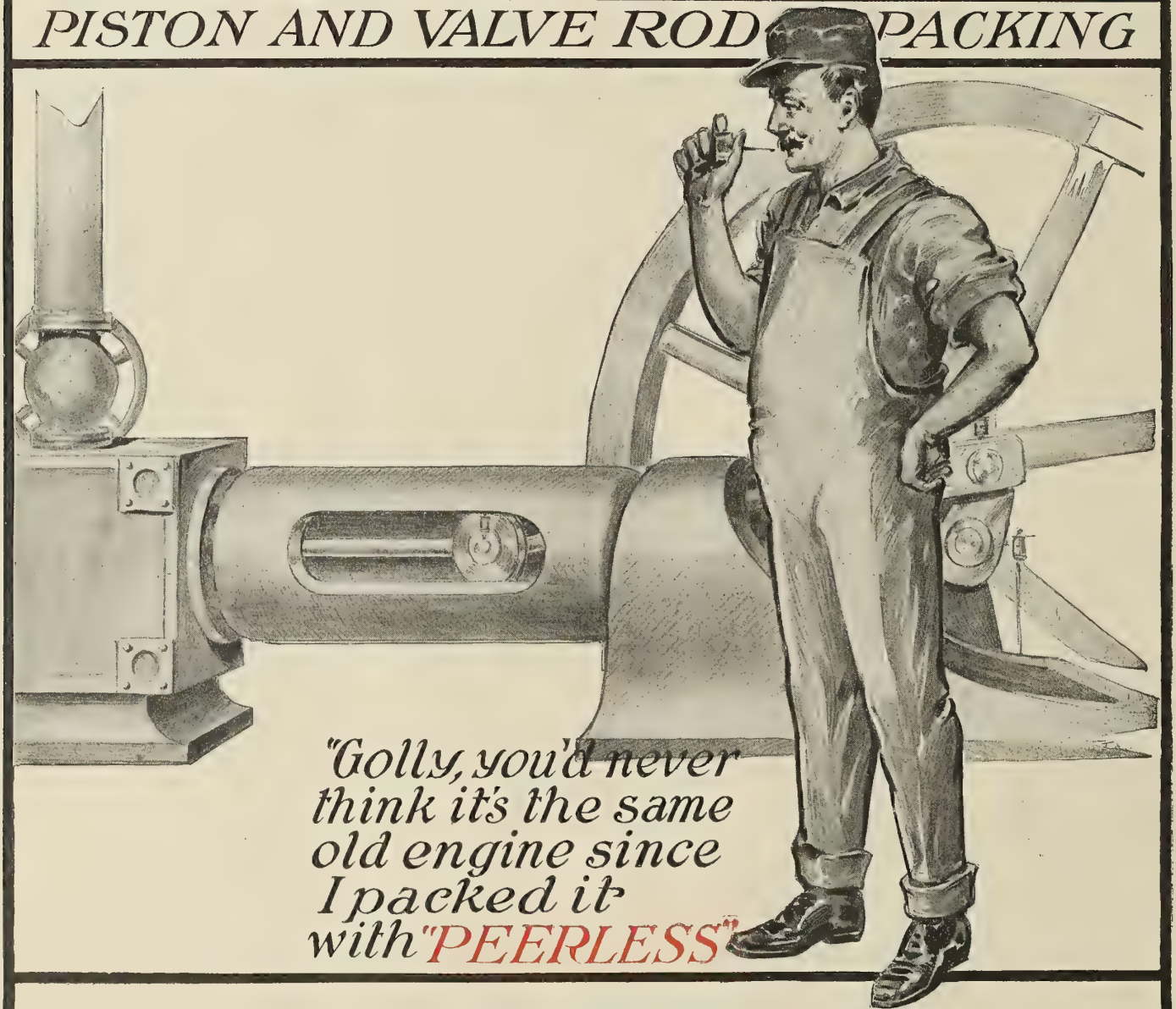

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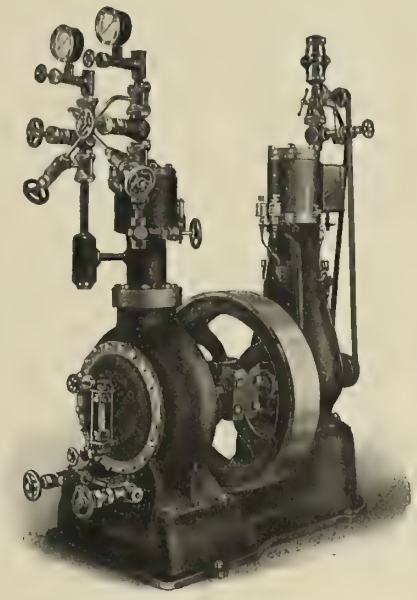

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"Merry Christmas"

"Watch the Thermometer"

Eckliff Automatic Boiler Circulators installed in Scotch Marine Boilers make them trouble-proof.

Raising 160 pounds steam in forty-five minutes—***from cold water***—is the record of a recent Eckliff installation. And there are many other Eckliffs furnishing like testimony. These records of proven achievement should mean much to you—they ***must.***

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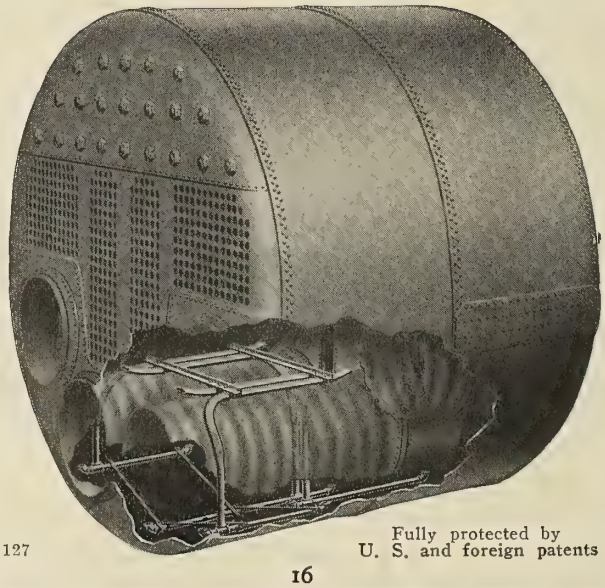

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JM Boiler Preservative Versus Boiler Scale

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When J-M Boiler Preservative is fed into a boiler it is attracted by the heated steel surfaces.
When water is heated, the scale-forming elements it contains are attracted by the heated steel surfaces.

Two things cannot occupy the same space at the same time. J-M Boiler Preservative is attracted by the heated surfaces of a boiler *to a much greater degree* than scale or scale-forming elements. It gets *underneath* the scale, next to the boiler and the scale is thus loosened, drops off, and can be blown or washed out.

It keeps the heating surface covered with a thin *heat-conducting* film that will not permit scale formation.

J-M Boiler Preservative is a natural remedy, made from a vegetable and contains salts extracted from the soil, so cannot injure a boiler, fittings or packings.

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We will send you one drum of J-M Boiler Preservative for a 60 days' free trial. Unless results satisfactory to you are produced, no charge will be made for quantity used in making test.

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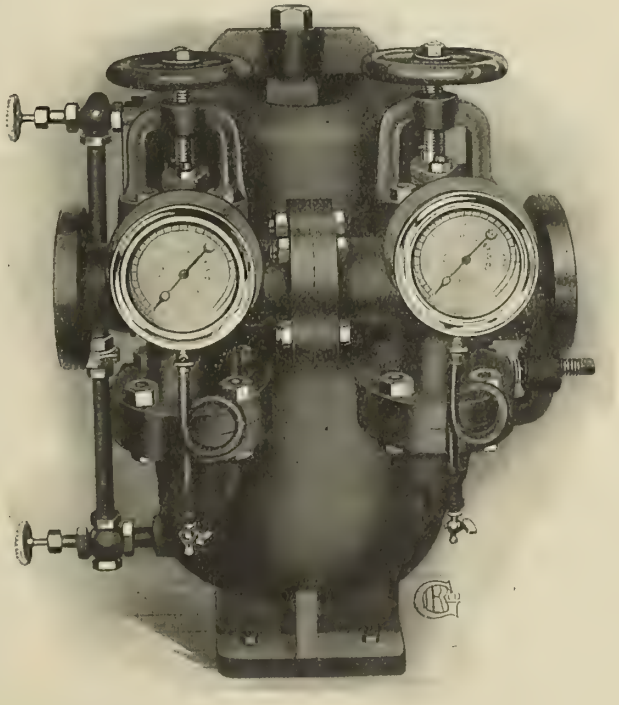

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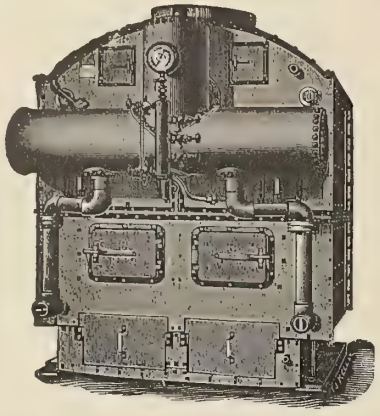

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Or it may be that unusual repair jobs of some sort have attracted the photographer.

Such pictures are usually valuable, as well as instructive, as they illustrate the vicissitudes and chances of life at sea; or perhaps bring out some important point in the manner of salving a vessel or making repairs.

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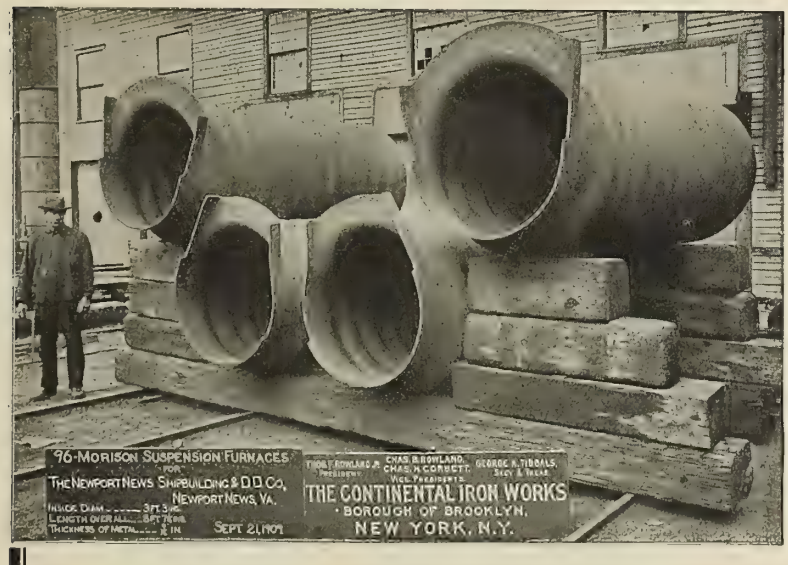

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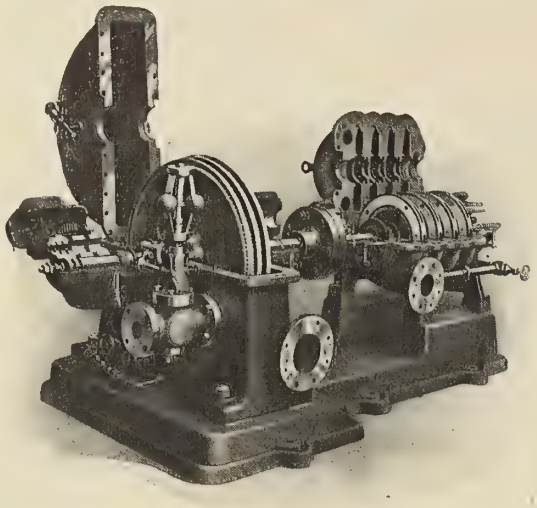

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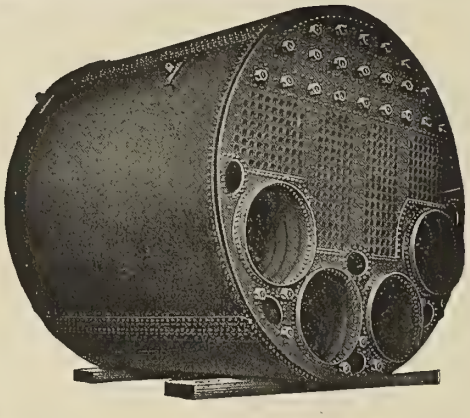

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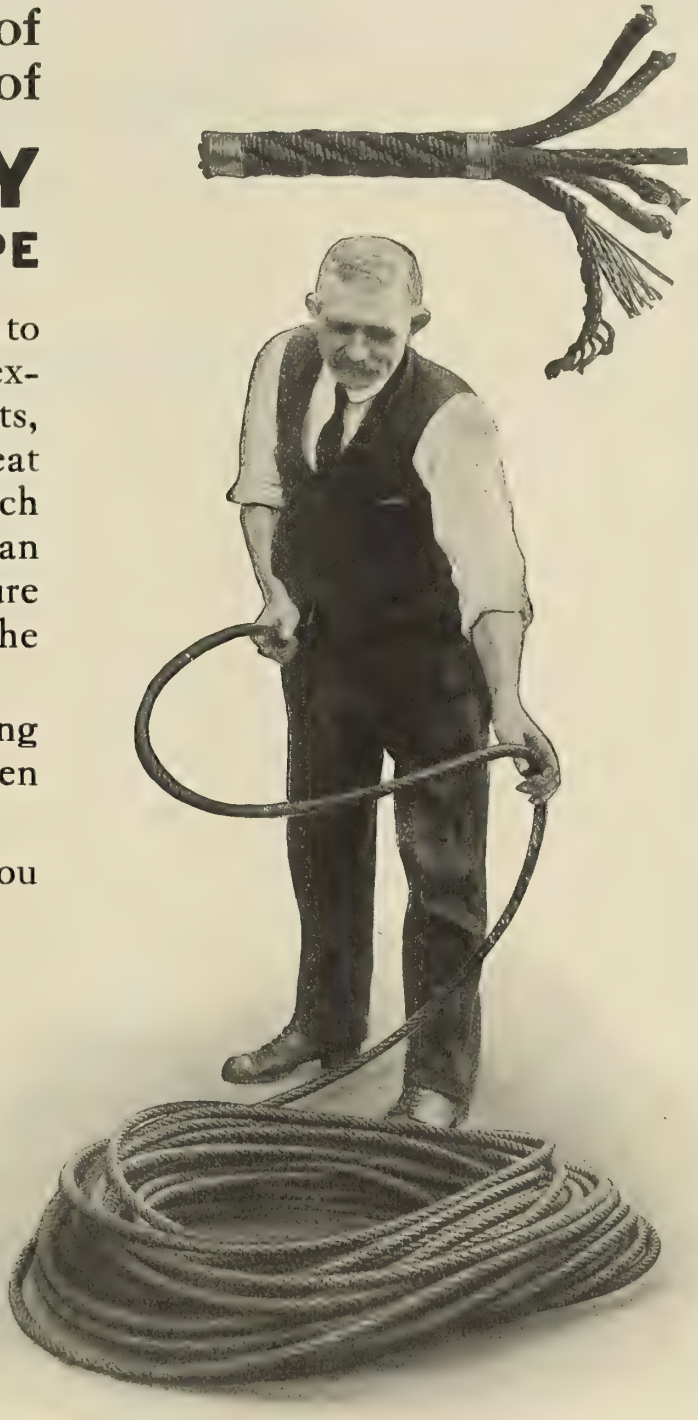

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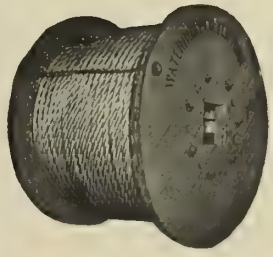

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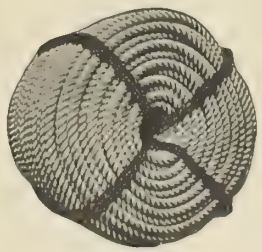

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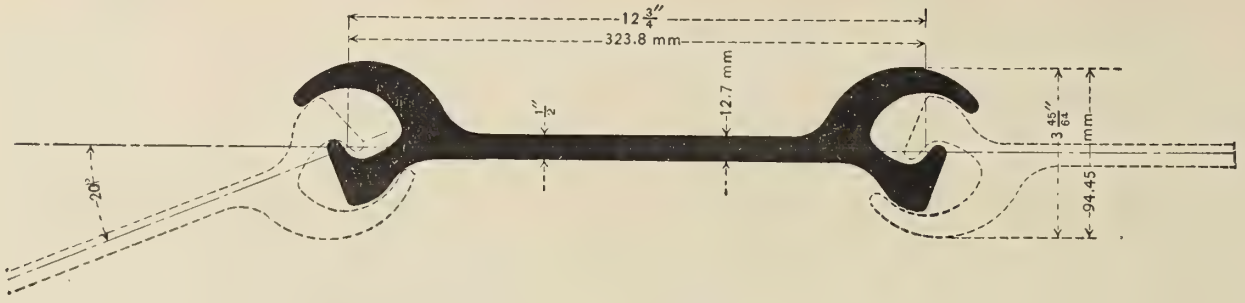

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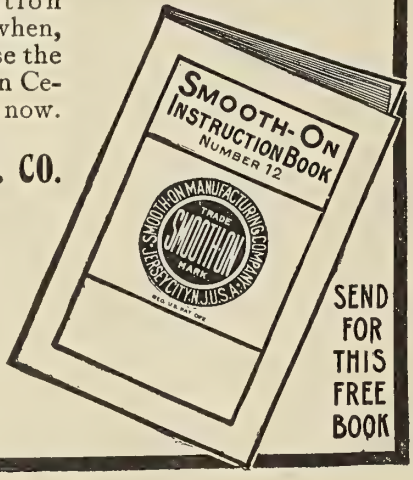

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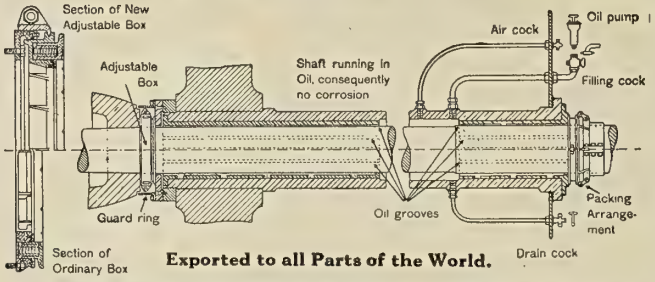

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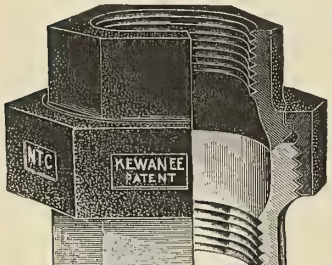
Interesting Experiences with KEWANEE Unions



"The Air-Tested Union With No Inserted Parts."

¶ This is the tenth of a series which we intend publishing in these pages from time to time, giving actual experiences supplied by consumers of "KEWANEE" Unions.

¶ If you have had similar interesting experiences, tell us about them; your brothers in the craft will find yours as interesting as these.

Hundreds of Disconnections—One Union

Experience No. 10*

¶ The following letter was recently received from an engineer of a large hotel in the Middle West.†

"Gentlemen:

¶ "I have used 'Kewanee' unions for about seven years in the————Plant. The Belcher water is a very strong sulphur saline water and is very destructive on pipe and fittings, making it necessary to repair pipes and fittings frequently.

¶ "I have never had any trouble in disconnecting pipe lines equipped with 'Kewanee' Unions. I have some 'Kewanee' unions that have been **disconnected twenty-five or thirty times, and they were all right when connected again.**

¶ "I have a number of 'Kewanee' unions in tanks used for heating water. I make coils in the shop and put them in sections and connect with 'Kewanee' unions in one end of tank, and the job has always been tight. I use them on all pipe line work and never have any trouble.

¶ "The saving in rubber for gaskets more than pays for the difference in first cost. Where unions with iron nut and iron ends are used, they rarely can be disconnected.

¶ "Leaky joints in unions are unnecessary where 'Kewanee' unions are used on steam, air, water, gas or oil lines, the 'Kewanee' will hold them all."

¶ This letter gives good reasons why YOU should know "Kewanee," doesn't it? The way to learn is in the free book, "THE WHOLE 'KEWANEE' FAMILY." Write for your copy now.

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1. Brass to iron thread connection—No corrosion. 2. Brass to iron ball joint seat—No gasket. 3. 125 pounds compressed air test under water—No defective fittings. 4. Solid, three-piece construction—No inserted parts. 5. Easily disconnected—No force required.

* Experience No. 1 published March, 1913; Experience No. 2 published April, 1913; Experience No. 3 published May, 1913; Experience No. 4 published June, 1913; Experience No. 5 published July, 1913; Experience No. 6 published August, 1913; Experience No. 7 published September, 1913; Experience No. 8 published October, 1913; Experience No. 9 published November, 1913; Experience No. 10 published December, 1913.

† Names and addresses supplied if you want them.

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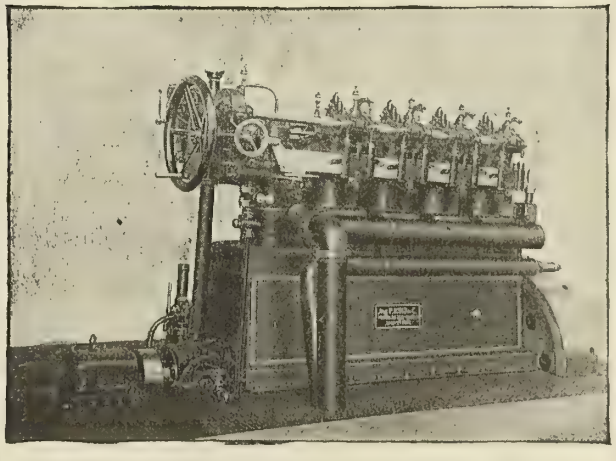

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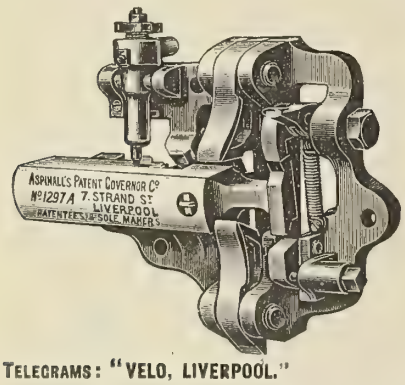

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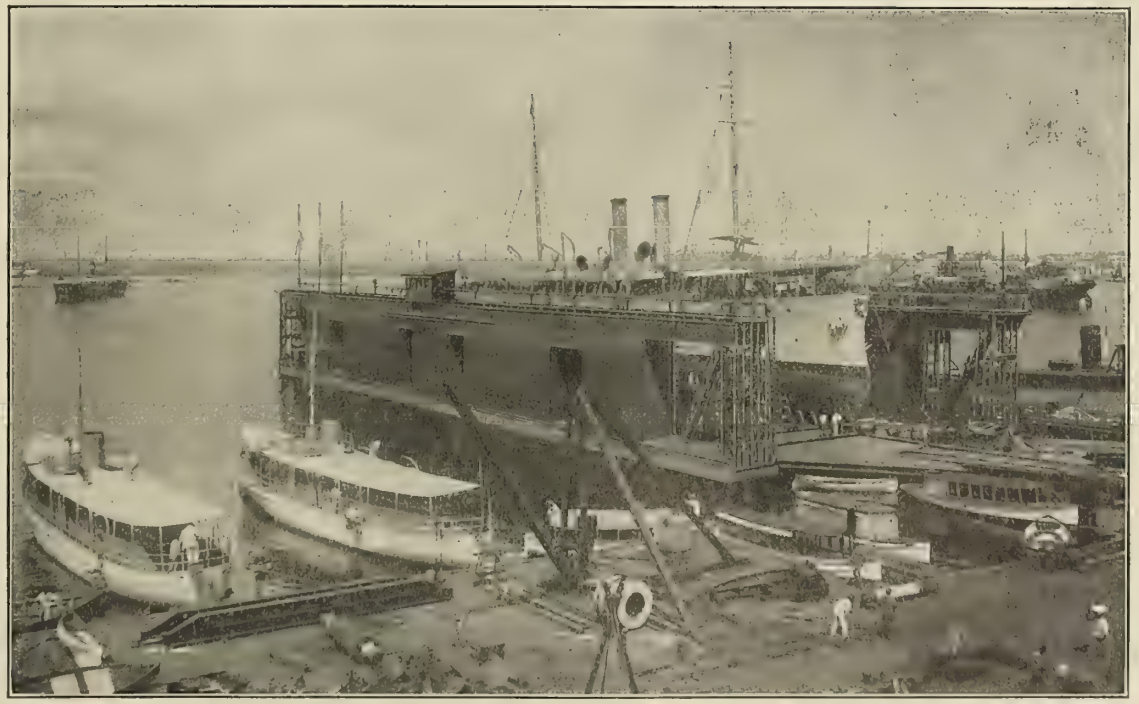

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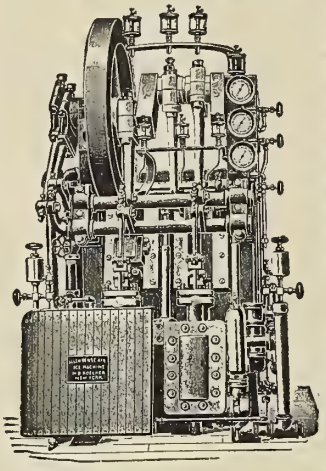

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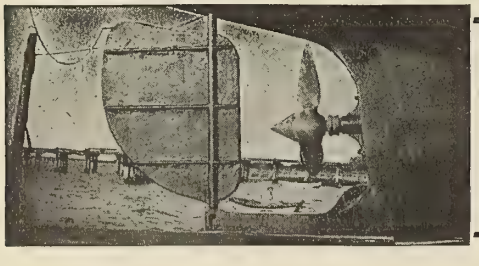

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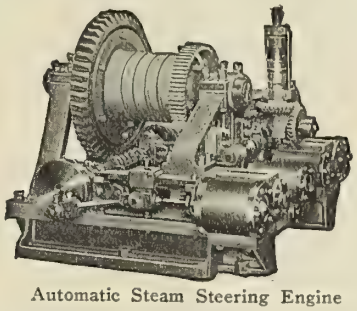

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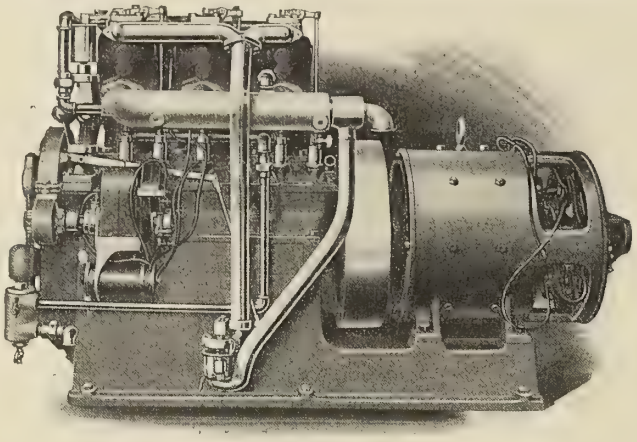

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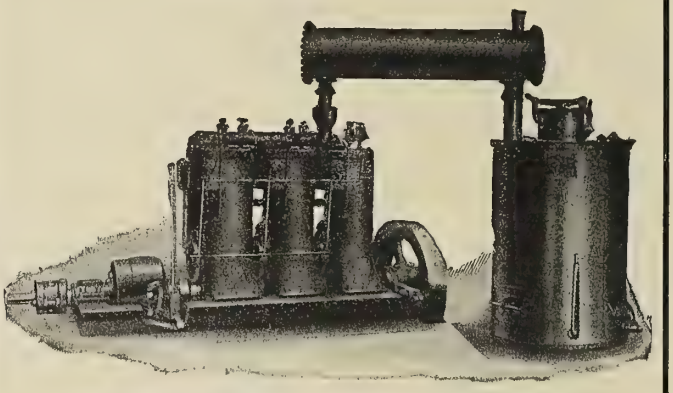

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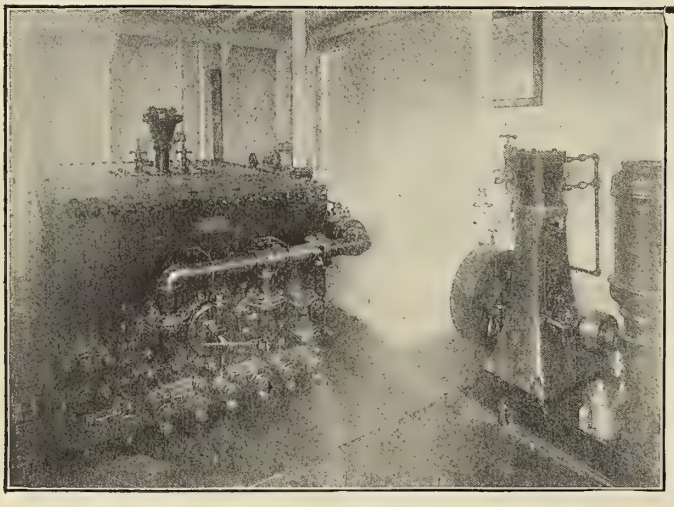

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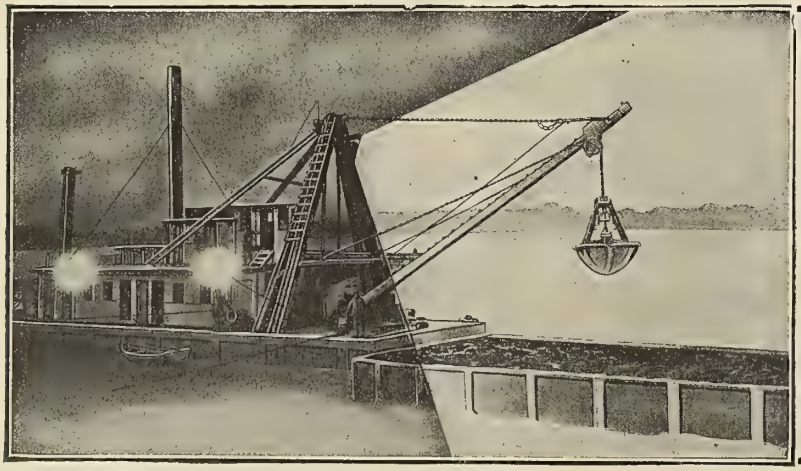

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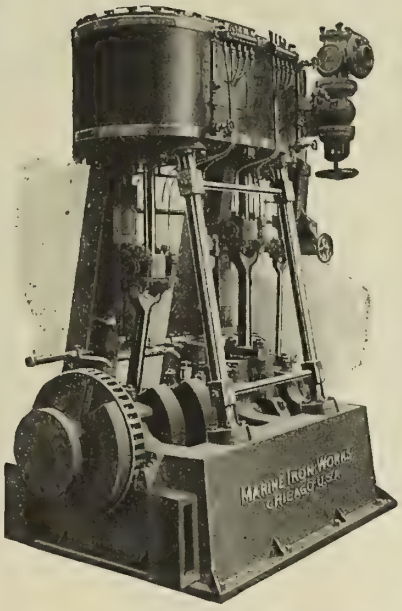

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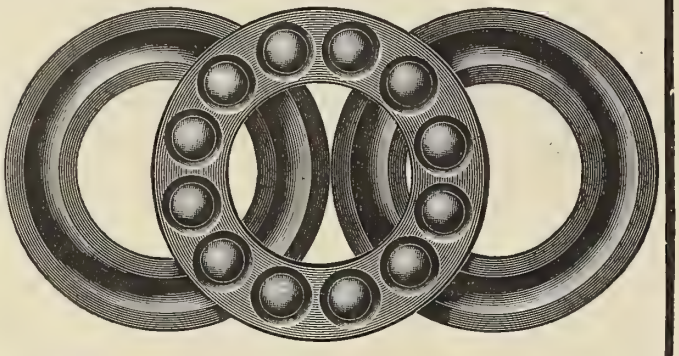

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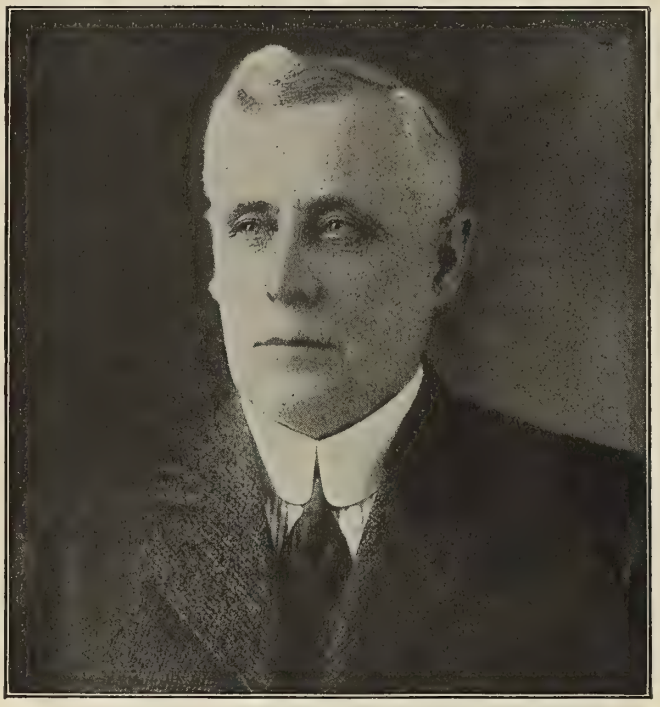

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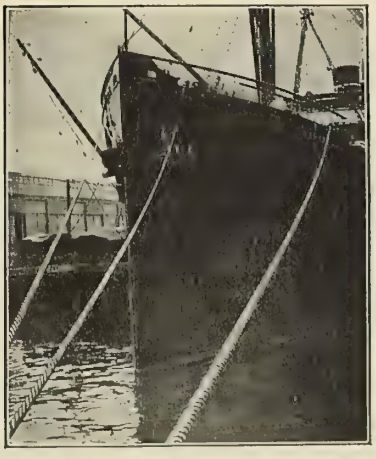

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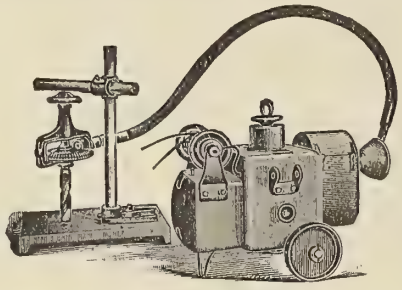

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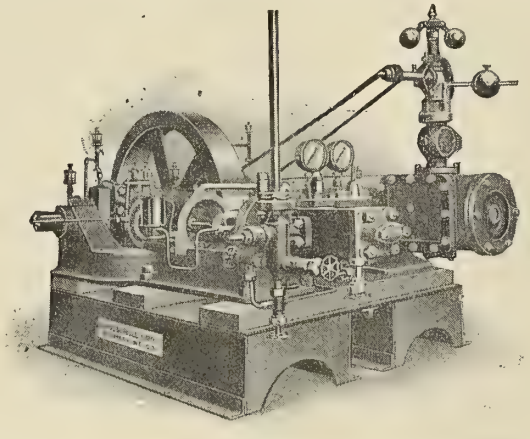

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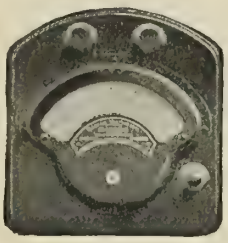

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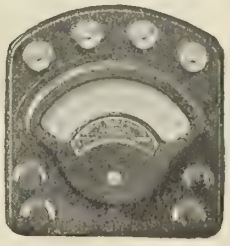

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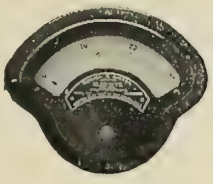

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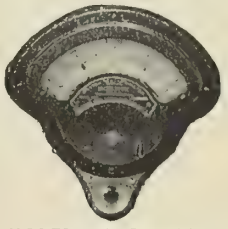

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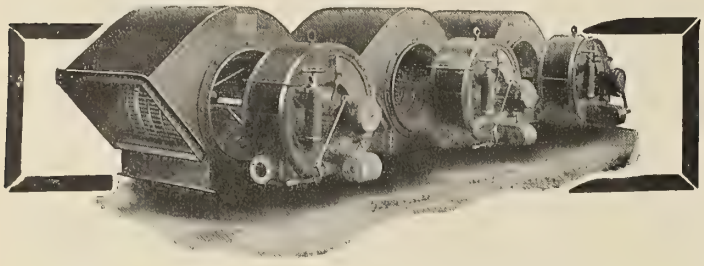

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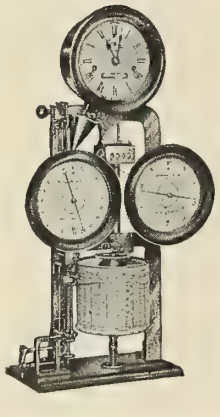

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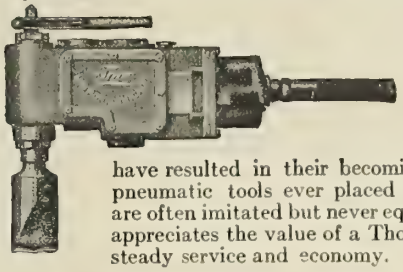

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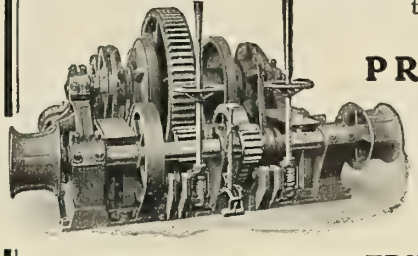

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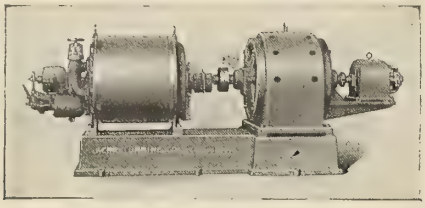

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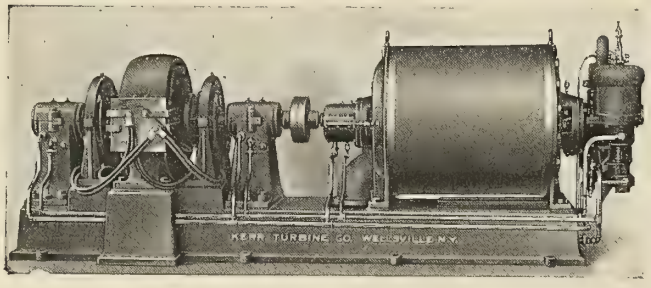

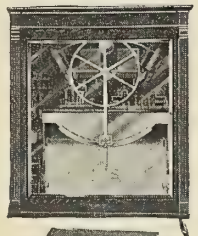

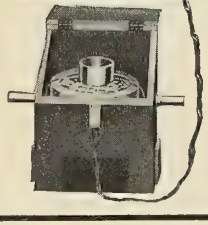

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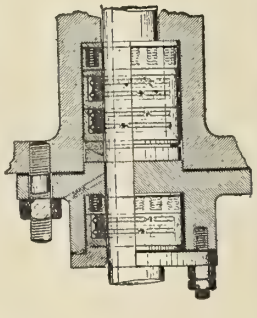

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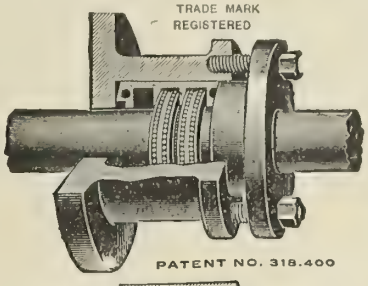

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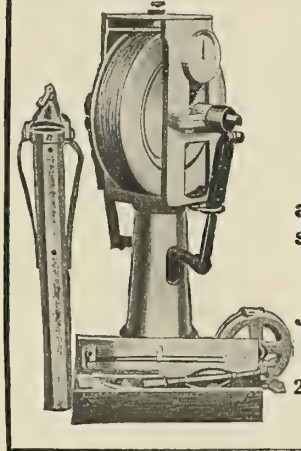

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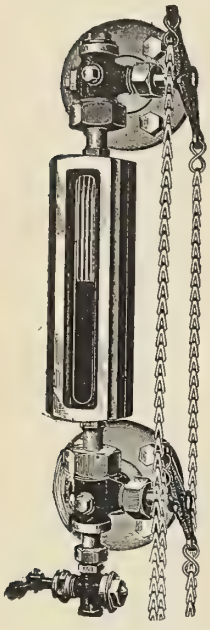

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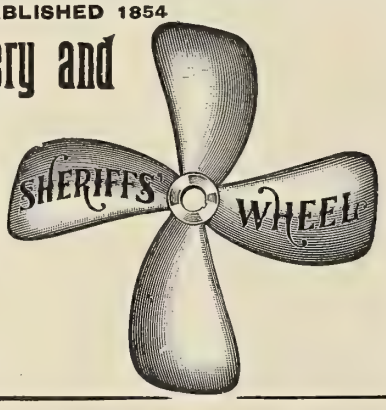

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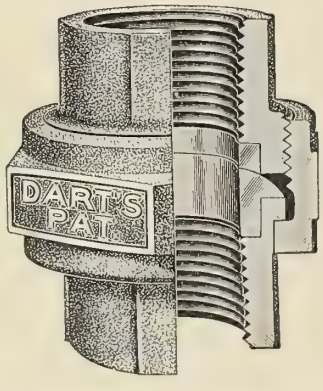

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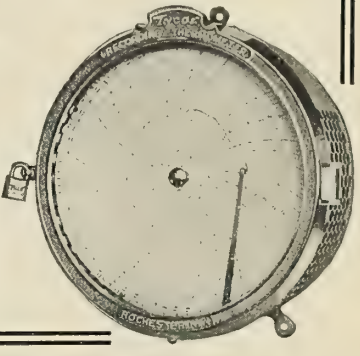

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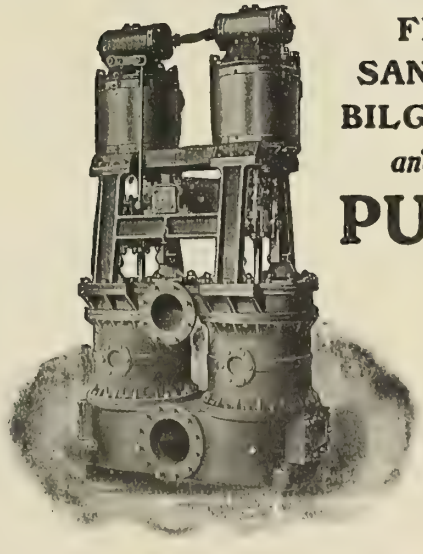

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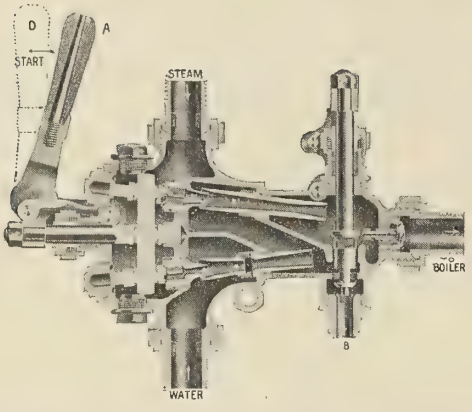

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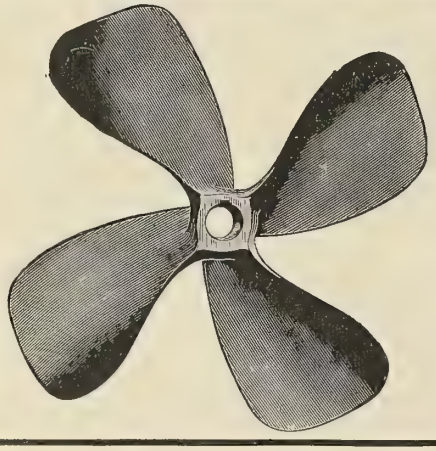

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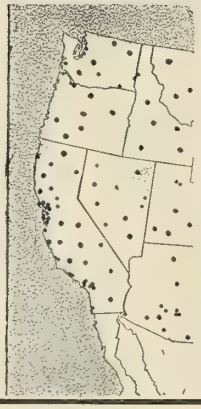

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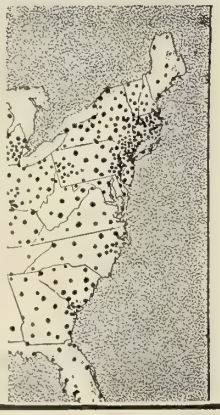

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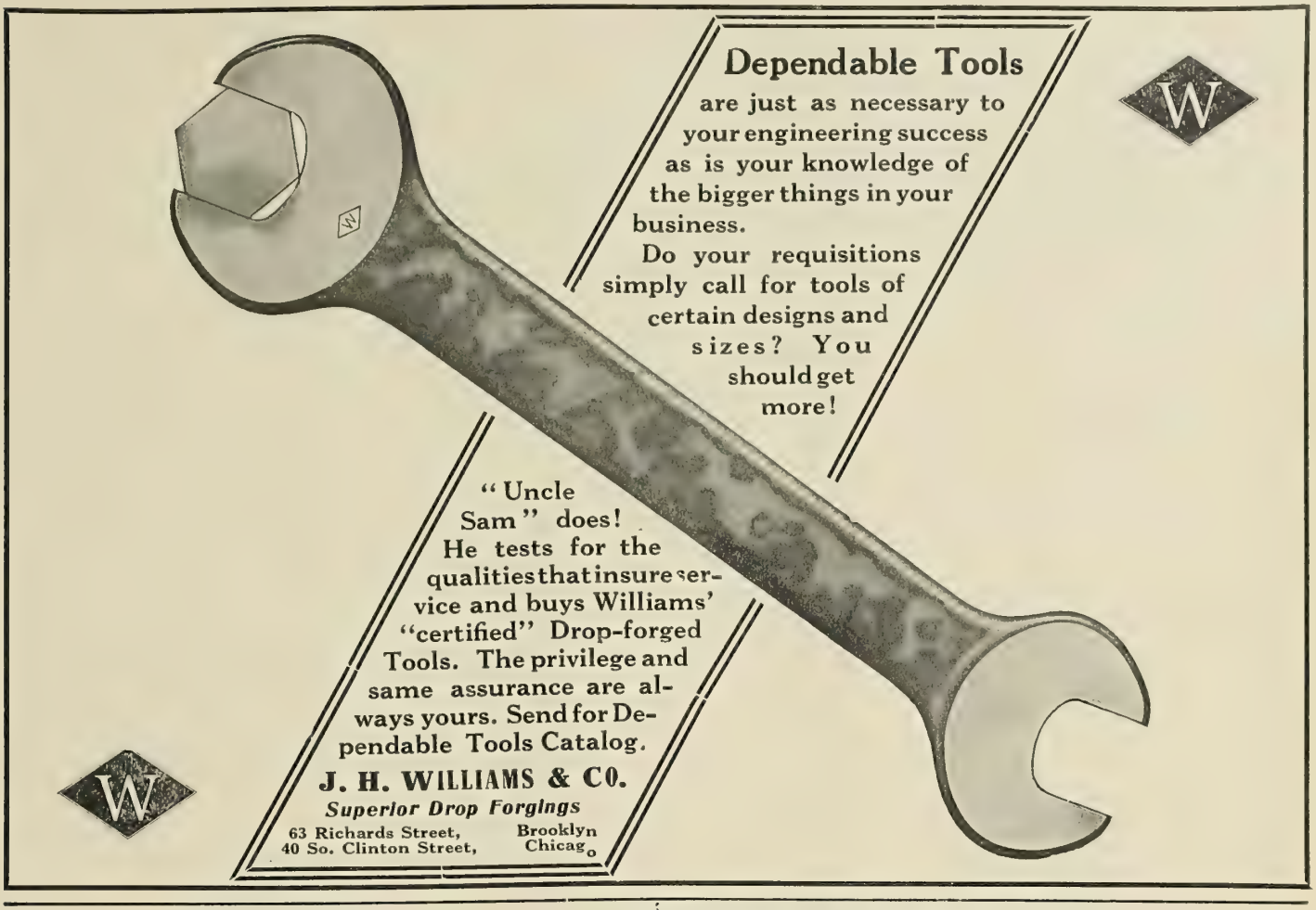
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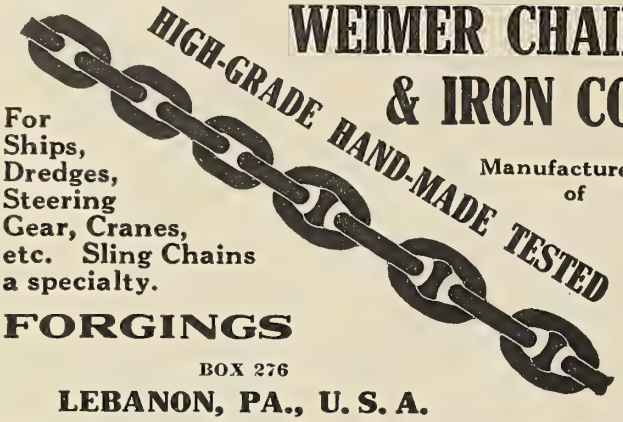

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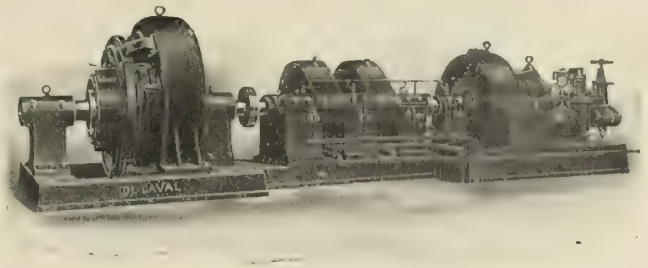

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TUGS—See SHIPBUILDERS.

TURBINES—See STEAM TURBINES.

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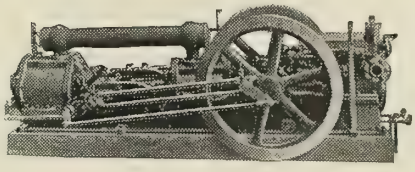
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INDEX TO ADVERTISERS

	PAGES
ALBANY LUBRICATING CO., New York	44
ALBERGER PUMP AND CONDENSER CO., New York	20
ALMY WATER TUBE BOILER CO., Providence, R. I.	18
AMERICAN BLOWER CO., Detroit, Mich	38
AMERICAN BUREAU OF SHIPPING, New York	31
AMERICAN ENGINEERING CO., Philadelphia, Pa	39
ARMSTRONG COLLEGE, Newcastle-on-Tyne, England	26
ASHTON VALVE CO., Boston, Mass	Inside Front Cover
ASHWELL & NESBIT, LTD., London, England	25
ASPINALL'S PATENT GOVERNOR CO., Liverpool, England	26
AULD COMPANY, Philadelphia, Pa	44
BABCOCK & WILCOX CO., New York	20
BALDT ANCHOR CO., Chester, Pa	51
BALTIMORE OAKUM CO., Baltimore, Md	49
BANTAM ANTI-FRICTION CO., Bantam, Conn	32
BATH IRON WORKS, Bath, Maine	29
BOYLE, JOHN & CO., Inc., New York	38
BRIDGEPORT MOTOR CO., Bridgeport, Conn	28
BRITISH MANNESMAN TUBE CO., LTD., London, England	25
BROWN, ARTHUR R., London, England	—
BROWN HOISTING MACHINERY CO., Cleveland, Ohio	33
BRUNSWICK REFRIGERATING CO., New Brunswick, N J	15
BUTTERFIELD, W. P., LTD., Shipley England	—
CARLISLE & FINCH CO., Cincinnati, Ohio	13
CEDERVALL & SONER, F. R. Gothenburg, Sweden	24
COLUMBIAN ROPE CO. Auburn and New York	Below Table of Contents, in Front of Magazine
CONTINENTAL IRON WORKS, Brooklyn, N. Y.	19
COOK'S SONS, ADAM, New York	44
COX & STEVENS, New York	47
CRANDALL ENGINEERING CO., East Boston, Mass	26
DART MFG. CO., E. M., Providence, R. I.	42
DAVEY, W. O., & SONS, Jersey City, N. J.	46
DAVIDSON, M. T., CO., New York	43
DECKER, DELBERT H., Washington, D. C.	51
DE LAVAL STEAM TURBINE CO., Trenton, N. J.	47
DIAMOND POWER SPECIALTY CO., Detroit, Mich	—
DIXON CRUCIBLE CO., JOS., Jersey City, N. J.	5
DONNELLY, W. T., New York	28 and 47
DURABLE WIRE ROPE CO., Boston, Mass	33
ECKLIFF AUTOMATIC BOILER CIRCULATOR CO., Detroit, Mich.	16
EDWARDS MANUFACTURING CO., Cincinnati, Ohio	5
EUREKA FIRE HOSE MFG. CO., New York	39
FAY MANILLA ROOFING CO., Camden, N. J.	46
FERDINAND & CO., L. W., Boston, Mass	5
FLETCHER CO., W. & A., Hoboken, N. J.	29
FORD CHAIN BLOCK & MFG. CO., Philadelphia, Pa	49
FORE RIVER SHIPBUILDING CORPORATION, Quincy, Mass	28
FUMIGATING AND FIRE EXTINGUISHING CO. OF AMERICA New York	30

PAGES

GAS ENGINE & POWER CO. & CHAS. L. SEABURY & CO., CONSOL., Morris Heights, N. Y. 30
GENERAL ELECTRIC CO., Schenectady, N. Y. Page facing leading article in front
GOLDSCHMIDT THERMIT CO., New York 35
GREENE, TWEED & CO., New York ..... Outside Back Cover
GRISCOM-RUSSELL CO., New York 17

HANCOCK, WRIGHT & CO,, London, England 13
HAND, JOHN E., & SONS CO., Philadelphia, Pa. 41
H. & M. DIVISION OF TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y. 43
HAYWARD & CO., S. F., New York 31
HEATH & CO., LTD., London, England ..... —
HOLMES METALLIC PACKING CO., Wilkesbarre, Pa. 41
HOUGH, EDWARD S., San Francisco, Cal. 47
HUTCHINSON, RIVINUS & CO., Philadelphia & New York 49
HYDE WINDLASS CO., Bath, Me. ..... Inside Front Cover

INDEPENDENT PNEUMATIC TOOL CO., Chicago and New York 39
ISHERWOOD, J. W., London, England 23

JERGUSON GAGE & VALVE CO., Boston, Mass. 42
JOHNS-MANVILLE CO., H. W., New York 17

KATZENSTEIN & CO., L., New York 40
KERR TURBINE CO., Wellsville, N. Y. 40
KEYES PRODUCTS CO., New York 11
KIND, ING. P., & CO., Turin, Italy 25
KINGSFORD FOUNDRY & MACHINE WORKS, Oswego, N. Y. 20
KRAJEWSKI-PESANT CORPORATION, Havana, Cuba 27
KROESCHELL BROS., ICE MACHINE CO., Chicago, Ill. 36
KRUPP, FRIED., Kiel, Germany ..... —

LACKAWANNA STEEL CO., Buffalo, N. Y. 22
LALOR FUEL OIL SYSTEM CO., Philadelphia, Pa. 8
LEAVITT MACHINE CO., Orange, Mass. 10
LIDGERWOOD MFG. CO., New York 29
LINK-BELT CO., Chicago, Ill. 50
LOCKWOOD MFG. CO., EAST BOSTON, MASS. 12
LUNKENHEIMER CO., THE, Cincinnati, Ohio ..... Inside Front Cover

McNAB CO., THE, Bridgeport, Conn. 32
MANNESMANNROHREN-WERKE, Dusseldorf, Germany ..... —
MARINE IRON WORKS, Chicago, Ill. 31
MARINE PRODUCER GAS POWER CO., New York 30
MARVEL, T. S., SHIPBUILDING CO., Newburgh, N. Y. 49
MERRILL-STEVENS CO., Jacksonville, Fla. 31
MIETZ, A., New York 28
MILBURN, ALEX. C. CO., Baltimore, Md. 30
MORSE, ANDREW J. & SON, INC., Boston, Mass. 49
MORSE TWIST DRILL & MACHINE CO., New Bedford, Mass. 41

NATIONAL TUBE CO. Pittsburgh, Pa. 24
NELSON VALVE CO., Philadelphia, Pa. 13
NEWPORT NEWS SHIPBUILDING & DRY DOCK CO., Newport News, Va. 31
NEW YORK BELTING & PACKING CO., New York 7
NICHOLSON FILE CO., Providence, R. I. 35
NICHOLSON SHIP LOG CO., Cleveland, Ohio 38
NILES-BEMENT-POND CO., New York 28
NORWALK IRON WORKS, South Norwalk, Conn. 49

OTIS ELEVATOR CO., New York ..... Inside Back Cover

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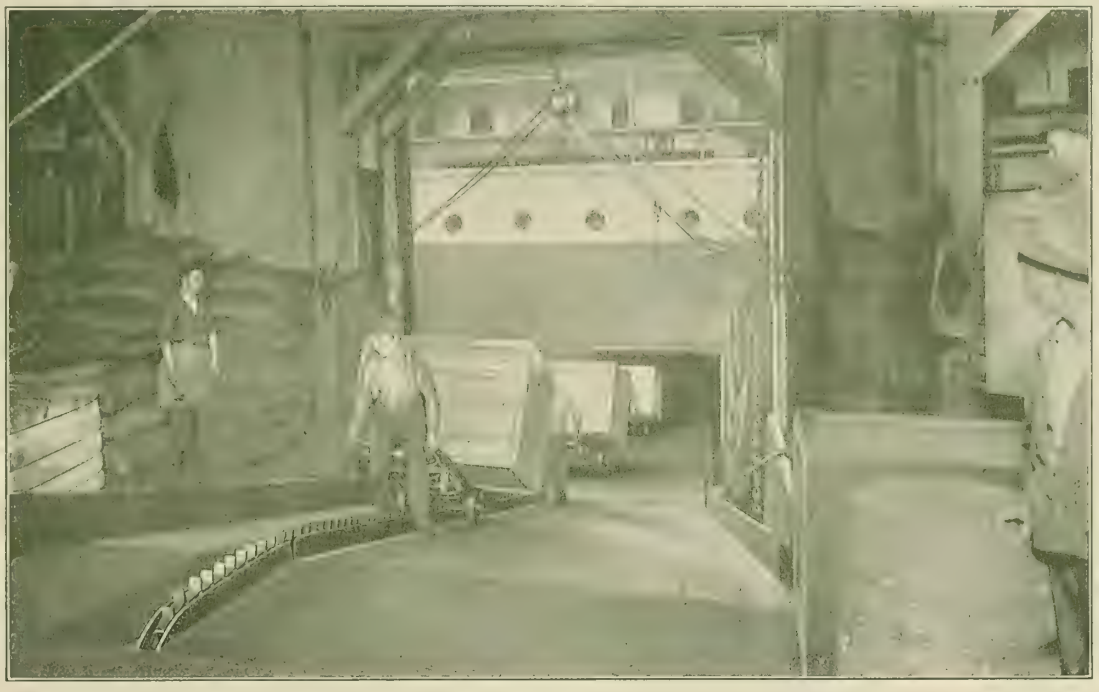
	PAGES
PARSONS MARINE STEAM TURBINE CO., New York	32
PEERLESS RUBBER MFG. CO., New York	14
PHOSPHOR BRONZE SMELTING CO., Philadelphia, Pa	49
PLYMOUTH CORDAGE CO., North Plymouth, Mass	52
POCAHONTAS FUEL CO., New York	27
POWELL, WILLIAM CO., THE Cincinnati, Ohio	4
ROBERTS SAFETY WATER TUBE BOILER CO., Red Bank, N. J.	Outside Front Cover
ROELKER, H. B., New York	28
ROSS SCHOFIELD CO., New York	29
SANDS & SON CO., A. B., New York	35
SCHUETTE RECORDING COMPASS CO., Manitowoc Wis	40
SCHUTTE & KÖRTING CO., Philadelphia, Pa	44
SEAMLESS STEEL BOAT CO., LTD., Wakefield, England	—
SEATTLE CONSTRUCTION & DRY DOCK CO., Seattle, Wash	29
SHERIFFS MFG. CO., Milwaukee, Wis	42
SIMPLEX ELECTRIC HEATING CO., Cambridgeport, Mass	29
SMITH'S DOCK CO., LTD., Middlesbrough, England	—
SMOOTH-ON MFG. CO., Jersey City, N. J	24
SPICER BROTHERS, Ltd., London, England	26
STANDARD CHAIN CO., Pittsburgh, Pa	Inside Front Cover
STANDARD MOTOR CONSTRUCTION CO., Jersey City, N. J	31
STAR BRASS MFG. CO., Boston, Mass	19
STARRETT CO., L. S., Athol, Mass	4
STOW MFG. CO., Binghamton, N. Y	36
STURTEVANT CO., B. F., Hyde Park, Mass	3
TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y	43
TERRY STEAM TURBINE CO., Hartford, Conn	9
TIETJEN & LANG DRY DOCK CO., Hoboken, N. J	29
TROUT, H. G., CO., Buffalo, N. Y	44
UNITED STATES METALLIC PACKING CO., Philadelphia, Pa	49
VROOMAN, S. B. CO., LTD., Philadelphia, Pa	39
WARD, CHAS. ENGINEERING WORKS, Charleston, W. Va	18
WATERBURY CO., New York	21
WEIMER CHAIN & IRON CO., Lebanon, Pa	46
WELIN MARINE EQUIPMENT CO., Long Island City, N. Y	6
WESTON ELECTRICAL INSTRUMENT CO., Waverly Park, Newark, N. J	37
WHITAKER, MORRIS M., Nyack-On-Hudson, N. Y	47
WHITLOCK CORDAGE CO., New York	51
WILLIAMS & CO., J. H., Brooklyn, N. Y	45
WILLIAMS VALVE CO., D. T., Cincinnati, Ohio	48
WILSON, R. & SONS, South Shields, England	—



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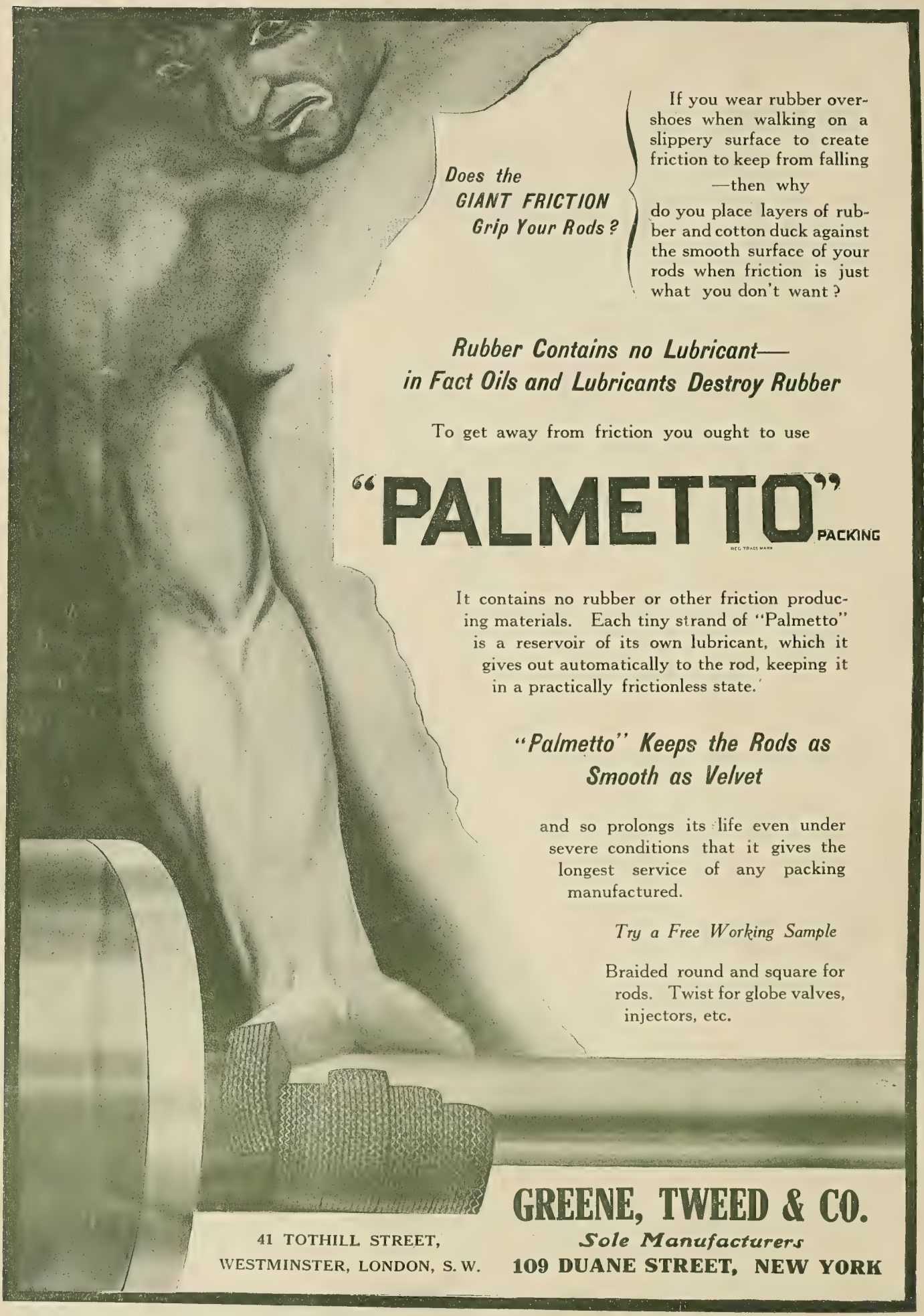

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